Report

Establishment of Branch Canal Water User Association in The Egyptian Irrigation System

June 1999

Task Order No. 807
Contract No. PCE-I-00-96-00002-00

Report

Establishment of Branch Canal Water User Associations in the Egyptian Irrigation System

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June 1999

For
United States Agency for International Development/Egypt

Environmental Policy and Institutional Strengthening Indefinite Quantity Contract (EPIQ)
Partners: International Resources Group, Winrock International,
and Harvard Institute for International Development

Subcontractors: PADCO; Management Systems International; and Development Alternatives, Inc.

Collaborating Institutions: Center for Naval Analysis Corporation; Conservation International; KNB Engineering and Applied Sciences, Inc.; Keller-Bliesner Engineering; Resource Management International, Inc.; Tellus Institute; Urban Institute; and World Resources Institute.

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Acknowledgements

This report was prepared by the EPIQ Water Policy Team *Water User Association Working Group*. Members of the group were Dr. Robert Cardinalli (Task Manager), Eng. Essam Barakat (IAS General Director) Dr. John Wilkins-Wells (Consultant), Eng. Nasser Ezzat (MPWWR/WPAU).

The EPIQ Water Policy Reform Program (WPRP) is a joint activity of the Ministry of Public Works and Water Resources and the United States Agency for International Development. It is carried out under the auspices of the Agricultural Policy Reform Program. Program implementation is the responsibility of Winrock International, International Resources Group, Ltd., and Nile Consultants.

In particular, the EPIQ/WRRP Chief of Party and task team members would like to acknowledge the contributions and support of the many IIS and IAS field engineers, agricultural officials and more than 9,500 farmers who participated in the formation of the Branch Canal Water User Associations. Special mention is due for the contribution of IAS Eng. Abdallah Doma in coordinating the BCWUA organizing process. The combined input of these individuals provided the basis for conclusions and recommendations contained in this report. Policy and technical guidance provided by the following individuals was significant and is greatly appreciated: Eng. Gamil Mahmoud, chairman of the MPWWR WRRP Steering Committee and the MPWWR Water Policy Advisory Unit; Dr. Craig Anderson, USAID Project Technical Officer; Eng. Ramsis Bakhom, Head of the IIS Sector, MPWWR. The members of the MPWWR Action Team on Participatory Irrigation Management, established as an output under this benchmark, individually and collectively made a major contribution toward outlining procedures for organizing BCWUAs.

Executive summary

This report presents the results of the work carried out in completion of Benchmark C-3 of the agreement between the Government of the Arab Republic of Egypt (GOE) and USAID/Egypt for Tranche III (FY 98/99). The benchmark states:

" The GOE will decree a policy and initiate an action program for formation of water user associations at the distributary and branch canal levels. "

Over 9,000 farmers participated in the process of Branch Canal Water User Association (BCWUA) formation. Central-level, general directorate and directorate staff of the IIP, IAS, and Irrigation Department took part, as well as extension workers, local leaders, and members of the Peoples Assembly. This report documents the process of BCWUA formation and policy development and presents conclusions and recommendations for improving the process, and for replication of these efforts on a broader scale. The ministerial decree formally sanctioning the establishment of a pilot program, and records of the process of initiating the pilot BCWUAs in are attached in appendices.

The rationale for BCWUAs in irrigated agriculture is based on principles of participatory irrigation management (PIM). Generally acknowledged benefits of PIM include, but are not limited to:

- productivity increases,
- positive changes in cropping intensity,
- improvement in financial impact performance indicators,
- resolution of water-related conflicts, and
- a positive environmental impact.

In 1981, the Ministry of Public Works and Water Resources (MPWWR) initiated the Irrigation Systems Management Project (ISM) with USAID funding. The ISM project was amended in 1984 to take advantage of the Egypt Water Use and Management Project (EWUP, 1977-84). The successor to the EWUP project was the Irrigation Improvement Project (IIP), which carried on the work of the ISM and began the incorporation of farmers' participation in irrigation improvement at the mesqa level. The IIP continued from 1989-96 with support from USAID. In 1996, the World Bank initiated a project in selected areas not previously covered.

The IIP is a socio-technical irrigation improvement process involving the support of active farmer participation in physical improvements and the subsequent management of improved systems. The IIP established a number of private mesqa-level water user associations (WUAs) and set up an institutional structure for an Irrigation Advisory Service (IAS). Mesqa-level WUAs have been instrumental in physical improvements, most notably single-point lift pumping, and the efficient organized maintenance of the mesqas, machinery and physical structures.

Recommendations from arising from the Tranche II (1997-98) benchmark on WUAs in areas not improved by the IIP included:

- establish water user organizations at the branch canal level, allowing for eventual expansion to the district level,
- review current legal ordinances and institutional regulations related to farmer participation in irrigation management,
- make necessary amendments to the existing laws, and
- strengthen the formal institutionalization of the Irrigation Advisory Service in the MPWWR.

In order to achieve these recommendations, it was suggested and adopted that 1) MPWWR would establish an Action Team of MPWWR, MALR and EPIQ officials to be an advisory body to MPWWR in matters related to expanding farmer participation in water management, and 2) two branch canals would be selected, one each in an IIP and a non-IIP area, for formation of BCWUAs.

The benchmark methodology included:

- issuance of a ministerial decree allowing the formation of BCWUAs at four selected locations;
- establishment of a ministerial Action Team on Participatory Irrigation Management;
- MPWWR Action Team orientation and training;
- training for benchmark implementation field teams (staff from IAS, IIP and Irrigation Department) in participatory rural appraisal (PRA) techniques, communications and BCWUA organizing elements;
- formulation of a common work plan and strategy for BCWUAs,
- development of policy objectives for BCWUAs, establishment of Egyptian chapter International Network on Participatory Irrigation Management (INPIM) in support of the BCWUA benchmark process;
- development of a phased process for organizing BCWUAs and establishing indicative parameters for BCWUA organizational structure and functions, including financial planning and budgeting, policy and procedures, administrative operations, legal foundation, description of Executive Council member's role and responsibilities, and the role of BCWUA manager;
- role and responsibilities of the District Engineer in supporting BCWUAs;
- IAS role in supporting the BCWUAs;
- role of MPWWR Action Team in BCWUA program and policy development; and
- importance of process documentation in BCWUA development.

This report summarizes the work undertaken in forming BCWUAs in the four selected locations. For each BCWUA there is a section on basic background data and information regarding agricultural and cropping practices, water delivery, and description of the physical system. A list of the Executive Councils for each BCWUA is given, along with the elected officers. In each case the District Engineer acts as an ex-officio member of the BCWUA. Detailed information is provided for Qemri, Bahr el Dahram and Balaqtar branch canals. (Work on the fourth sanctioned command area, El Reity canal (Qena

Governorate), began late in the Tranche III process and will be reviewed in a subsequent report.)

Cost-sharing plans were developed at two of the locations, i.e. Qemri and Bahr el Dahram branch canals. Preparation of two cost-sharing plans is a verification indicator for this benchmark. There are eight basic elements of the cost-sharing plan:

- Operations and Maintenance (O&M) work being undertaken in a negotiated process by the BCWUA with additional involvement of the GOE,
- BCWUA setting an achievable target for O&M performance, for which they would be reimbursed for most costs through a contracting arrangement with GOE,
- using a 5-year calculation base to determine annual O&M cost ceiling,
- developing the cost-sharing plan in 3-year incremental phases, incorporating BCWUA institutional performance targets,
- negotiation and selection from among several options of a particular *pathway* for O&M by the BCWUA and GOE,
- issuance of a Memorandum of Understanding (MOU) between the BCWUA and GOE for the O&M pathway,
- conducting by the IAS of training workshops for BCWUA members to support the work in the MOU, and
- a plan for phasing in a mesqa improvement package and using the BCWUA to form mesqa-level WUAs.

Results of cost-sharing planning workshops at Qemri and Bahr el Dahram BCWUAs are incorporated into the plans. The plans focus on sharing of O&M responsibilities, and illustrate that farmers are willing to contribute toward routine maintenance, and supervision in system operations, and managing controls over water distribution among mesqas, monitoring flow levels and controlling violations and disputes. The values ascribed to these activities are indicative, i.e. not absolute and would need to be subject to verification, but point to a clear reduction in costs to the GOE. A suggested financial budget illustrates distribution of tasks and responsibilities. An additional added value to GOE will be in the role the BCWUAs play in organizing mesqa-level WUAs, thus reducing IAS and IIP overhead costs for personnel and equipment.

Recommendations

Increased user participation in planning, operation, maintenance and management of branch canal irrigation units is a desirable goal and is supported by the results achieved during this benchmark implementation period. Formation and establishment of water user associations at the branch canal level is viable, highly desirable means of advancing farmer participation in irrigation management. Management capabilities and capacities at this level must be supported and improved as water supplies become more constrained and the innovation of continuous flow availability is advanced to larger areas of the system. Willingness on the part of users to assume part of the O&M costs as well as mesqa WUA organizational costs (as witnessed through the focus group process), in the

form of time, labor, and other resources, serves to reduce government costs, and affirms that eventual management transfer can be successfully negotiated.

The development of semi-autonomous and quasi-private irrigation districts may be a long-term goal. In such cases, the district water user organizations are entirely responsible for the operation, maintenance and periodic upgrading of water delivery and control structures within their districts. This *irrigation management transfer* process should be the subject of a performance benchmark during the next cycle of water policy reform implementation.

The working group identified two significant recommendations as paramount next steps. The first will be to amend Law 12 regarding formation of BCWUAs throughout Egypt, as part of the overall review and revision of the law. The second is an innovative policy initiative pilot program on transferring irrigation system management to the private sector.

- MPWWR will take steps to amend Law 12 to allow formation and registration of Water Users Associations in all categories of land and among primary, secondary and tertiary levels of the irrigation system. Until such time as the law is amended, these organizations will function legally under the mandate of a MPWWR ministerial decree.
- MPWWR will develop a pilot program introducing Irrigation Management Transfer (IMT) in at least two selected locations. IMT presents a logical progression in the participatory process from developing branch canal-level user associations. The incentives for Government and farmers and other private sector entities to undertake this initiative include a reduction in the cost of irrigation, enhanced financial self-reliance of irrigation schemes, expansion of service areas, greater irrigation water efficiency, and increases in cropping intensity and yields. This recommendation represents a major policy and conceptual shift toward empowering users. The process of irrigation system subsection management transfer is an evolutionary one, and a national plan for management transfer would be phased-in over a period of several years.

Other recommendations are based on the activities implemented under this benchmark:

- MPWWR should strengthen the IAS through adequate budgetary, infrastructure, training and personnel resources.
- MPWWR should continue to support and strengthen the role of the ministerial Action Team on Participatory Irrigation Management.
- Mesqa-level and branch canal WUAs should include both irrigation and drainage functions, thereby discontinuing the need for separate drainage collector associations.
- IAS should adopt a flexible approach and procedure for organizing BCWUAs, using an integrated departmental team strategy, depending on local prevailing conditions.
- MPWWR should establish, with BCWUA cooperation, maintenance centers for spare parts, equipment and other O&M material used in irrigation improvement at the branch canal level.

- BCWUAs, irrigation district engineers, IAS engineers and IIP engineers will jointly plan, design and implement branch and distributary canal improvements in the command area and establish continuous flow and downstream water level control.
- In unimproved command areas, IAS should establish BCWUAs at least one to three-years in advance of any irrigation improvement program intervention.
- In national irrigation projects, e.g. Toushka and El Salaam, while land is being distributed, 1) membership in a canal association should be included as part of the contract agreement, and 2) the contract agreement should include a statement of rights and responsibilities regarding water management and canal maintenance.
- The branch canal O&M cost-sharing plan process should continue to be refined and adopted as a standard feature of the BCWUA organizing process. As the process gains acceptance, and as application mechanisms are clearly defined and approved by MPWWR, a schedule for pilot implementation should be undertaken.
- The Irrigation Advisory Service (IAS) should strengthen central as well as local coordination with public and private sector agencies, e.g. Agricultural Extension, agricultural census unit, cooperatives, banks, growers' associations, local councils, research institutes, et. al.
- Coordination should be maintained with all other projects working in this sector, e.g. the Netherlands government-assisted project on water boards.
- Awareness building programs for BCWUAs and MPWWR engineers, technicians and field agents, need to focus on priority concerns.
- The potential for WUAs in New Lands, national project areas and oases needs to be carefully assessed and analyzed for future planning.

1. Introduction

1.1 Overview

The Agricultural Policy Reform Program (APRP) is a four-year United States Agency for International Development (USAID) grants program involving several ministries. The Ministry of Public Works and Water Resources (MPWWR) is the primary Egyptian governmental agency charged with the management of water resources. MPWWR and USAID under the umbrella of the APRP jointly designed a water policy package, which consists of integrated water policy and institutional reforms. USAID supports the Ministry's efforts through annual cash transfers based on performance in achieving identified and agreed upon policy reform benchmarks and technical assistance.

Co-ordination among MPWWR, USAID and the water policy technical assistance program is through the Water Policy Advisory Unit (WPAU) and a project steering committee established by the MPWWR.

Technical assistance for the water policy analysis activity is provided through a water resources results package task order (Contract PCE-I-00-96-00002-00, Task Order 807) under the Environmental Policy and Institutional Strengthening Indefinite Quantity Contract (EPIQ) between USAID and a consortium headed by the International Resources Group (IRG) and Winrock International. Local technical assistance and administrative support for EPIQ is provided through a subcontract with Nile Consultants.

The EPIQ Water Policy team assists MPWWR to identify and carry out policy reform which will increase the global efficiency and productivity of Egypt's Nile water system under a water resources results package task order. EPIQ directly assists and takes a lead in identifying and achieving annual policy reform benchmarks, working closely with the MPWWR steering committee, WPAU, key ministry officials, and other APRP units.

1.2 Purpose of the Report and Background

A memorandum of understanding between the Arab Republic of Egypt (GOE) and USAID listing mutually agreed policy reform benchmarks for the APRP Tranche III period (1 July 1998 – 30 June 1999) was signed on 27 September 1998. Benchmark 3 of Section C of the APRP medium/long term policy goals: Agricultural Land and Water Resource Investments, Utilization and Sustainability states:

"The GOE will decree a policy and initiate an action program for formation of water user organizations at the distributary and branch canal levels."

The benchmark includes three achievement *verification indicators*:

- A ministerial decree allowing the formation of water user organizations above the mesqa level,

- Process Documentation reports (demonstrating) that organizations were formed on two branch canals (one in an IIP and one in a non-IIP community), and
- A cost-sharing plan prepared for two branch canals in consultation with the stakeholders.

To implement the policy benchmark activity, a task team was set up, led by the EPIQ Senior Sociologist, and with members representing the Water Policy Advisory Unit and the Irrigation Advisory Service. The task team developed a work program to cover activities between October 1998 and June 1999. This work program was incorporated into the overall EPIQ work plan.

A methodology was developed which allowed for an efficient Branch Canal WUA organizing process, within a flexible time frame, utilising the existing personnel and capabilities of the Irrigation Advisory Service and the Department of Irrigation.

1.3 Organization of the Report

Following the Introduction (Chapter 1) there is a general overview of participatory irrigation management experiences in Egypt (Chapter 2). A summary of the major conclusions and recommendations from the Tranche II work program provides the basis for Chapter 3. A description of the Tranche III benchmark methodology is presented in Chapter 4. Chapter 5 summarizes and analyzes the work carried out on the selected branch canals. The results of the efforts on developing branch canal cost-sharing plans for O&M are described in Chapter 6, including recommendations to be made to the MPWWR Minister. Chapter 7 highlights benchmark conclusions and recommendations. Literature referenced in this report can be found in Chapter 8.

2. Background and Problem Description

2.1 Overview of Water User Association Development in Egypt

The primary Government of Egypt agency responsible for water resources management is the Ministry of Public Works and Water Resources. As such, it is mandated to plan, construct, operate, manage and maintain the irrigation and drainage network in Egypt. The MPWWR distributes irrigation water to Egypt's "old lands" by diverting water at various points on the River Nile to principle canals, which, in turn, feed a complex network of main canals. Most of the main system operates on gravity flow. Water is generally supplied below the surrounding farm ground level, which means that farmers must use pumping devices to lift water from the watercourse supplying their farms. Exceptions include the Fayoum oasis and some canal commands in Upper Egypt, where deliveries to farm turnouts are by gravity flow.

2.1.1 Brief Background of WUA Formation and Development Initiatives in Egypt

In 1981, the MPWWR initiated the Irrigation Management Systems Project (IMS) with USAID funding. The IMS Project was amended in 1984 to take advantage of the seven-year Egypt Water Use and Management Project (EWUP, 1977-84), an interdisciplinary project implemented by the MPWWR. The recommendations[1] of that project related to farmer participation in irrigation management were:

- farmers should be involved in improvements to the water delivery system,
- farmers must play a role in ensuring more efficient operations, improved maintenance and protection of physical works,
- farmers should become involved in management of water,
- there is a need for a well-trained cadre of IAS professionals to provide farmers with services related to water delivery and water use, and effectively organizing mesqa-level WUAs, and
- continued farmer involvement is essential for improved operations, water scheduling, mesqa improvements and renovations of branch canals.

As a successor to EWUP, the Irrigation Improvement Project was added as a component of IMS in 1987, and has since evolved in organizational status to a "sector" within MPWWR, with a number of projects for irrigation improvement assisted by several donors and international lenders. Participatory irrigation management began in a formal way under the IIP, and while many lessons have been learned, insufficient monitoring and evaluation were carried out to document the impact.

[1] MPWWR, Egyptian Water Use and Management Project, Findings of the Egypt Water Use and Management Project, Improving Egypt's Irrigation Systems in the Old Lands, MPWWR, March 1984, pages 55-58.

2.1.2 Brief Overview of the IIP and the Introduction of the IAS

The IIP has established a number of private WUAs and set up an institutional structure for the Irrigation Advisory Service. Cost recovery measures for mesqa improvements, a vital element in the PIM process, have been instituted. The MPWWR has established a special fund for collections payments realized from cost recovery.

This section is an attempt to identify lessons that are important for developing appropriate policies for expanding WUAs to non-IIP areas and for forming water user apex organizations (e.g. branch canal organizations in both improved and unimproved areas). It is the view of MPWWR that merely transferring O&M responsibilities to secondary level users' organizations, without adequate level of incentive, is neither prudent not possible. It should not be assumed that farmers would willingly organize and operate or maintain systems that are run-down and cannot provide a predictable and stable water supply. BCWUAs are not designed to take over the roles and responsibilities of the district engineers and others, but are seen as a means of complementing and supplementing the work of the irrigation department. User participation programs in countries as diverse as Mexico, Colombia, Senegal, the United States and Indonesia have demonstrated positive results in involving farmers and reducing government expenditures.[2] A review of the literature reveals certain elements that tend to exist in successful secondary level user associations. These are:

- clear aim and purpose in a charter backed by appropriate legislation and policies,
- clear incentives for water users, who devise their own rules and have clear sanctions for those who violate them,
- improved services to water users if they are to be expected to mobilize financial and other resources for O&M and irrigation improvements,
- clear roles and responsibilities of water suppliers as well as water users,
- accountability and transparency of irrigation agencies and WUA members,
- time and flexibility so that water users and suppliers can learn to be successful, and
- monitoring (process documentation) and chronicling of records for future reference.

[2] Sevendsen, Mark and Meinzen-Dick, Ruth, Irrigation Management Institutions in Transition: a Look Back, a Look Forward, in Irrigation and Drainage Systems, Kluwer Academic Publishers, Printed in the Netherlands, 1997, pages 139-156.

3. Recommendations from Tranche II Findings

One of the concrete results of the Tranche II work on WUAs was a set of recommendations, which guided the formulation of this present benchmark, and were adopted by the EPIQ Project Steering Committee:

- Generally support the overall expansion of participatory irrigation management in the Egyptian irrigation system.
- Encourage establishment of Water User Associations in areas not covered previously under any IIP phase, and improve the strategies and policies of development in the following ways:
- Give first priority to completion of the remaining IIP mesqas as expeditiously as possible.
- Establish criteria for selecting major irrigation development sites in the future over large command areas.
- Establish water user apex organizations on those branch canals which have the potential for future expansion to an institution at the irrigation district level. Alternatively, a mechanism should be established for operation and maintenance at the branch canal level.
- Develop the main and the branch canals in a way that aids the achievement of objectives/targets of the IIP.
- Review the current legal ordinances and institutional regulations (related to water user organizations), and further amend and expand them to strengthen the current and future needs of irrigation improvement.
- Study and analyze the organizational, legal, and administrative requirements to support the functioning and authority of WUAs and water user apex organizations.
- Strengthen the formal institutionalization of the IAS in the ministry in order to enable it to perform its tasks efficiently.

In order to achieve these objectives, it was concluded the following steps must be taken:

- Establish by ministerial decree, an Action Team comprised of MPWWR officials and other key players experienced in the development of participatory water user organizations.
- Select two initial branch canals that are technically and economically feasible and acceptable to the water users for forming branch canal user organizations: one in an IIP area with WUAs, and the other in a non-IIP area with no WUAs. Establish all necessary decrees and recommendations required to fulfill this objective.
- Design and conduct a training course for IAS staff, district engineers and WUA members to orient them to the exigencies of branch canal water user organizations and other levels of participatory irrigation management.
- Conduct a study and prepare plans for establishing privatized water user associations in the El Salaam, North Sinai, and Toushka Projects.[3]

[3] A study on formation of water user organizations in New Lands is scheduled for September 1999.

4. Description of Benchmark Methodology

4.1 Selection of Branch Canals and Ministerial Decree

A decision was taken by the benchmark task group[4] in October 1998 to select four branch canals, two in improved and two in unimproved areas. The benchmark task group carried out a field survey of a number of branch canals in Upper Egypt and in the Nile delta. Four branch canals were recommended to the project Steering Committee, which endorsed the recommendation and forwarded it to the MPWWR Minister for approval. MPWWR issued a decree authorizing formation and registration of BCWUAs on four specific canals, and establishing a Ministerial Action Team to support the BCWUA process. A copy of the Ministerial Decree is included in this report as part of Appendix A.

4.2 Training and Orientation for Ministerial Action Team and Benchmark Field Teams

As part of the orientation for the teams involved in the implementation of this benchmark both the Action Team and the benchmark field teams participated in training programs.

4.2.1 Ministerial Action Team Study Tour

The MPWWR Action Team embarked on a two-week study and orientation program conducted by Colorado State University. This hands-on workshop primarily focussed on how to organize farmers to operate canals upstream of the mesqas in branch canals. During the course of the workshop, the Action Team developed a detailed action plan for:

- improving Egyptian farmer-operated mesqa organizations; and
- organizing branch canal WUAs so that farmers can take increased responsibility for water delivery, conflict management, and routine operations and maintenance in the irrigation system above the mesqa level.

The plan includes organizational criteria and breakdown of responsibilities for water scheduling and delivery, raising local revenue, financial record-keeping, setting financial priorities for O&M, conflict management, and performing facility maintenance at the several canal levels. The details of the plan have been incorporated into sections 4.3 to 4.10 of this chapter.

The workshop also included in-depth study of two major private sector water delivery and management entities: the Northern Colorado Water Conservancy District and the New Cache La Poudre Irrigation Company. The Action Team members analyzed the managerial, financial record-keeping and technical aspects of both organizations, comparing them to the current level of water management and delivery in Egypt.

[4] Dr. Robert Cardinalli, EPIQ, Task Leader, Eng. Essam Barakat, IAS Gen. Director, Eng. Nasser Ezzat, WPAU, Eng. Ramsis Bakhom, IIS Head.

4.2.2 Training for Benchmark Field Teams

Training for the benchmark field teams was designed as an integral component of the EPIQ work plan for this benchmark. Training was conducted in three phases between January and April 1999, for district engineers and technicians of the Irrigation Department, for IIS and the IAS, and for field agents.

The objectives of the training were to:

- provide field engineers and other field operatives with appropriate inter-communication skills for farmers and branch canal community groups;
- develop skills in collecting and transferring information from and to target beneficiary groups on the four branch canals, and in generating impact monitoring and evaluation feedback;
- develop capabilities in participatory rural appraisal techniques as a tool for BCWUA command area diagnostic analysis.

The training was intended to assist in creating information channels to help assess the impact of the benchmark activity on all levels.

During the first phase of the training program participants were trained in planning, implementation, analysis and reporting on PRA based survey and monitoring. During the second phase, the participants were introduced to the basic elements of PRA, supervising, monitoring and reporting.

The training utilized a mixture of case study analysis, field exercises, working groups, preparation of sample PRA reports, and lecture/discussions.

The curriculum modules covered the following subjects:

- Principles of communication skills
- Confrontation and withdrawal methods
- Methods of dialoging
- Methods of conducting participatory meetings
- Mechanics of knowledge transfer
- Conflict management through participatory methods
- Identifying target groups, and leaders
- Report writing techniques
- Participatory Rural Appraisal (PRA) and why it is appropriate for BCWUA development
- Principles of PRA
- Sources of participatory data and information, and methods of analysis
- Methods and mechanics of carrying out PRA exercises
- Limitations and timeliness of using PRA methods
- Techniques of preparing and presenting PRA reports

4.3 Policy Development

During the Tranche II workshop regarding WUAs, the project Steering Committee adopted the option for increasing user participation in irrigation management. This option stated that branch canal WUAs would be organized in non-IIP areas, in order to facilitate the process of mesqa-level WUA development, as well as in IIP areas, in order to strengthen the work of the existing mesqa-level WUAs and better align them with the Irrigation Department.

Additional measures included:

- Branch canal WUAs, working closely with the district engineer, the IAS and IIP engineers, will participate in the planning and implementation of the necessary improvements to the branch and distributary canals, mesqa off-takes, tail escapes, etc. to allow continuous flow. The BCWUA will have an operational oversight role, working with the district engineer to monitor and regulate water delivery to unimproved mesqas until mesqa improvements are completed.
- Facilitate private sector mesqa improvement, where highest demand is experienced, with IIS/IAS oversight.
- Institutionalize the IAS as a separate unit within MPWWR.
- Along with farmer participation, prioritize selection of new improvement command areas.

Farmers interviewed during the organization of the four BCWUAs indicated an expectation for efficient O&M on the branch canals. They also indicated they would need a maintenance center facility to be used for organizing meetings, storage of equipment and spare parts, and farmers' training. The facility would also function as a center for services from the MPWWR Drainage Authority, and MALR, e.g. extension and pest management. The BCWUA members emphasized the need for a stable water supply with continuous flow as crucial to ensuring their collective, sustained participation. If continuous flow cannot be maintained, a predictable and fair rotational water supply, the design and planning of which would involve the BCWUAs, is the preferred secondary option. Furthermore, the BCWUAs expressed the need for a legal institutional foundation if they will be expected to operate, manage and maintain the branch canals. A number of participants indicated they would like to have the MPWWR decentralize authority and decision-making (and not just responsibilities) to the district engineers.[5]

[5] It is interesting to note that the issues and prerequisites to effective organizing of Branch Canals expressed by farmers is clearly similar to the responses from farmers during the Tranche II WUA focus groups.

4.4 Establishment of INPIM Chapter in Egypt in Support of BCWUA Development

As part of the BCWUA benchmark work program, MPWWR USAID/EPIQ with collateral support from EDI/World Bank sponsored the holding of a national workshop on participatory irrigation management, on 15-18 November 1999 in Alexandria. The objectives of the workshop were to exchange information and experiences regarding PIM at the international and regional levels; to develop recommended guidelines for establishing and supporting WUAs above the mesqa level; and to formally launch to formally launch an International Network on Participatory Irrigation Management (INPIM) chapter in Egypt.

Among the conclusions and recommendations adopted by the plenary were:

- BCWUAs should be proactive in branch canal O&M.
- BCWUAs should take primary responsibility in supervising and monitoring water distribution below the branch canal intake, and schedule distribution between mesqas.
- BCWUAs should be proactive in improving soil and drainage conditions in their respective commands.
- BCWUAs should be included as members of the local chapter of INPIM.
- BCWUAs should have, as ad hoc members, representatives from Irrigation, Drainage and Agricultural Extension.
- BCWUAs to be granted legal authority commensurate with its functional mandate.
- Pending formal amendment to the existing Law 213, BCWUAs should be allowed to operate legally by MPWWR ministerial decree (as in the case of the El Fayoum situation).
- BCWUAs' executive councils should have a minimum of 5 and a maximum of 15 members, and be based on representation for each 500 – 750 feddans, with an equal distribution of members from head, middle and tail reaches of each branch canal.
- The BCWUA executive council will have a chairman, secretary, treasurer and manager.
- BCWUAs should be the conduit between beneficiaries and all relevant government agencies in matters related to irrigated agriculture (Irrigation, Drainage, MALR, and Agricultural Development Bank, etc.)
- BCWUAs should focus also on other issues in addition to irrigation and drainage, e.g. social environment, water and soil quality, etc.
- BCWUAs will handle resolution over disputes related to water delivery and allocation.
- BCWUAs will report member violations of procedures to the appropriate authority.
- BCWUA officers will receive training in organizational management, financial management, and record keeping.
- MPWWR will establish a ministerial Action Team to advise and assist MPWWR and the BCWUAs in policy and implementation matters.
- MPWWR is to consider a recommendation to initiate an Irrigation Management Transfer program in selected pilot areas during FY 1999/2000.

The recommendations of the INPIM workshop were adopted by MPWWR and formally issued in February 1999. The Summary Proceedings are included as Appendix C of this report. The work program for BCWUAs incorporated the workshop recommendations into its schedule.

4.5 BCWUA Organizing Process

At its first structured meeting, the MPWWR Action Team for Participatory Irrigation Management developed the following process for organizing Branch Canal Water User Associations. The process has since received ministerial ratification and approval.

- The branch canal will be divided into natural hydrological reaches (i.e. head, middle and tail).
- Influential persons will be identified on each reach for initial contact.
- Irrigation district and IAS field teams will hold several individual and joint meetings with influential farmers on each reach.
- Field teams will hold additional meetings with branch canal stakeholders on each reach to explain the program, address queries, and help farmers to plan their activities.
- When the influential local leaders and field teams feel confident that farmers are sufficiently apprised of costs and benefits related to BCWUA formation, farmers on each reach will be asked to nominate representatives to sit on the BCWUA Executive Council. The Executive Council can, at its own discretion, have a membership ranging from 7 to 15 members, depending on branch canal stakeholder population.
- The Executive Council may, at its discretion, designate the Irrigation Department Engineer as an ex-officio member of the Executive Council.
- The Executive Council will select its officers (Chairman, Vice-Chairman, Treasurer and Secretary) from among Executive Council members.
- The BCWUA will designate one person to manage daily operations. Until the BCWUA starts generating its own resources, this operations manager may be a Council member on a volunteer basis.
- The Executive Council's meeting minutes will be communicated to the Governorate office.
- The Executive Council will develop a list of priorities and issues for action, and an implementation schedule to support it.

4.6 BCWUA Organizational Criteria

4.6.1 Purpose of the Association

The purpose of BCWUAs is to represent a collective association of cultivators on a branch canal, and to liaise with the Irrigation Department in all matters related to operation, maintenance and management of the branch canal.

4.6.2 BCWUA Budget and Financial Planning

- There are existing laws requiring farmers to financially participate in BCWUA O&M. However, the BCWUA may opt to collect assessment fees using modalities practiced by mesqa-level WUAs, e.g. based on feddans under commanded irrigation per year, or based on number of hours of irrigation.

- Other potential sources of resource mobilization:
  - Member voluntary contributions,
  - Income from work contracted by BCWUA
  - Bank interest and investment dividends.

4.6.3 General BCWUA Policy and Procedures:

- The treasurer will maintain regular bookkeeping functions.
- BCWUA funds can be withdrawn only with the signature of both the chairman and treasurer.
- The Executive Council will approve all purchases or contracts under the BCWUA.
- General policy issues (including fee assessments) will require approval by the Executive Council.
- The General Assembly of the BCWUA will review and approve the final annual budget.

4.6.4 BCWUA Administrative Operations

Each BCWUA will establish an office and hold its regular meetings in one of the following venues:

- Office of the District Engineer
- IAS Field Office
- Premises provided by BCWUA member
- Rented premises (paid by BCWUA)

4.6.5 BCWUA Legal Foundation

- Law 213, which amends Law 12 on Irrigation and Drainage, does not allow for the formation of BCWUAs in old lands. The law must be further amended to allow BCWUAs on these lands.
- The MPWWR will need to prepare appropriate documentation in support of an amendment to the law allowing for BCWUAs to be formed in old lands.

4.7 BCWUA Functions and Responsibilities

- Monitoring the irrigation and drainage performance and requirements and the water level in the area served by the branch canal.
- Regularly prepare a set of observations and recommendations on branch canal issues for joint review with Irrigation Department officials.
- Manage scheduling and water deliveries between branch canals and mesqas.

- Regularly conduct and oversee branch canal maintenance work for pitching and weeding and embankments and gates.
- Perform leveling and compaction of embankment pads.
- Assume major responsibility for the establishment and strengthening of mesqa-level Water Users Associations
- Manage BCWUA internal finances.
- Manage BCWUA internal administration.
- Interface with public sector authorities, e.g. Irrigation Department, MALR, Drainage Authority, District Council, etc., regarding problems that arise on the branch canal.
- Assist farmers on the branch canal with seasonal crop plans. Collect cropping plans for each mesqa, and review with Irrigation Department and MALR.
- Follow up on the cropping plan implementation and report back to the irrigation or drainage authority directorate.

4.8 Responsibilities of the Executive Council

The Executive Council will have operational and managerial control over the BCWUA, including planning, monitoring, fiscal management and implementation. The following delineation of tasks and responsibilities illustrates this control in greater detail. It also shows the important role of other major stakeholders in the process, including the District Engineer, the Irrigation Advisory Service and the MPWWR Action Team.

4.8.1 Chairman of the Executive Council

- Monitor the association's activities.
- Chair all BCWUA meetings.
- Represent the BCWUA with other agencies.
- Approve BCWUA expenses and sign for withdrawals of money.
- Maintain direct contact with district engineer on all branch canal related issues.
- Serve as signatory on all BCWUA contracts and agreements.

4.8.2 Vice Chairman

- Assume Chairman's responsibilities in his absence.
- Develop agenda and work plan for BCWUA activities.
- Monitor implementation of the official BCWUA work plan.

4.8.3 Secretary

- Record all BCWUA meeting minutes.
- Inform BCWUA members of scheduled meetings and distribute agenda.
- Promptly record and disseminate any decisions taken by the BCWUA, and follow up on any further action required.
- Follow up on administrative decisions regarding the BCWUA

- Supervise the BCWUA manager's activities, and receive the manager's weekly report.

4.8.4 Treasurer

- Collect user assessment fees and issue receipts.
- Monitor and control all account deposits and withdrawals .
- Serve as signatory on checks.
- Maintain all ledgers and current accounts related to BCWUA income and expenses.
- Coordinate preparation of annual budget, along the BCWUA Executive Council members.
- Make regular financial reports to the BCWUA, including consolidation of all supporting financial statements and documentation.

4.8.5 Executive Council Members at-Large

- Follow up implementation of the Executive Council decisions in each reach.
- Designate roles and responsibilities for each of the specialized BCWUA sub-committees: Technical Committee, Communication Committee, and Follow-up Committee.
- Liaise on a day-to-day basis with the BCWUA manager.
- Organize and supervise scheduling water flow between Mesqas.
- Organize and supervise branch canal maintenance work, and coordinate with the District Engineer.
- Vet and refer farmer requests to Executive Committee, as necessary.
- Monitor use and misuse of branch canal; report back to the Executive Council.
- Prepare and submit a weekly Activity Report to the BCWUA Secretary.
- Oversee the work by short-term manual labor contracts under the BCWUA.
- Make certain the canals are clean and free-flowing at all times, and report any problems to the BCWUA Secretary for remedial action.
- Attend BCWUA meetings and execute any instructions and/or recommendations (as communicated through the BCWUA Secretary).
- Participate in the preparation of the BCWUA Annual Work Plan.
- Participate in the planning and execution of BCWUA member training by the Irrigation Advisory Service and MPWWR Water Communications Unit.

4.8.6 BCWUA Manager

- Monitor water flows to mesqas.
- Monitor logistics related to BCWUA maintenance work.
- Process requests from farmers to appropriate Executive Council sub-committee).
- Note any misuse of facilities or water delivery and refer to the Executive Council.

- Prepare and submit a weekly branch canal status report to the BCWUA Secretary.
- Monitor work of short-term labor contracts.
- Oversee branch canal maintenance work.
- Attend BCWUA meetings and execute the BCWUA instructions and orders (as commun-icated by BCWUA Secretary).
- Contribute suggestions at the time of BCWUA Annual Work Plan preparation.

4.9 Role and Responsibilities of the District Engineer in Supporting BCWUA Work

- Identify technical problems, and propose solutions to BCWUA Executive Council.
- Provide the Executive Council with technical data required for sound decision-making.
- Assist Executive Council members in setting the Annual Work Plan.
- In the event of varying opinions on technical matters on the branch canal, the view of the District Engineer will predominate.

4.10 Role and Responsibilities of the Irrigation Advisory Service in Supporting BCWUA Work (IAS Engineers)

- Coordinate the organizing process and establishment of BCWUAs.
- Increase farmer awareness about BCWUAs.
- Develop awareness among Executive Council members as to BCWUA roles and responsibilities and provide necessary technical consultation.
- Provide orientation and training to Executive Council members and branch canal manager
- Participate in BCWUA meetings.
- Regularly collect data on BCWUA performance and problems, evaluating activities. Report problem issues to MPWWR Irrigation authorities.
- Assist the BCWUAs in organizing mesqa-level WUAs (in non-improved areas), as well as the technical package of improvements
- Assist the BCWUA and mesqa-level WUAs prepare for the mesqa improvements.
- Coordinate with MPWWR Water Communication Unit to develop awareness of building programs among farmers and field staff. (Prepare fliers, news bulletins, posters, publications etc).
- Coordinate with Agriculture Extension Service and other related agencies in the Ministry of Agriculture to strengthen BCWUAs and WUAs.
- Facilitate establishment of communication linkages between BCWUA and different ministerial agencies.

4.11 Role of the MPWWR Action Team in BCWUA Program Development

- Follow up work on the formation of the BCWUAs.
- Monitor the Annual Work Plan activities of the BCWUA.
- Hold regular monthly meetings.
- Keep MPWWR and other agencies apprised of plans for establishing new BCWUAs, and prepare reports accordingly.
- Help in establishment of an IAS information database on WUAs.
- Meet with BCWUA Executive Council members, as needed.
- Assist IAS in setting up a BCWUA monitoring and evaluation plan.
- Advise the MPWWR in drafting the legal amendments to formally institutionalize BCWUAs.
- Help MPWWR identify local and international sources of financial and technical assistance to support the BCWUA concept.
- Advise the MPWWR in its role as leader of the Egyptian chapter of INPIM[6]
- Advise MPWWR in the preparation of a training plan for MPWWR staff and BCWUA leaders on PIM.
- Advise and assist MPWWR agencies in conducting workshops and seminars on BCWUA activities and programs.
- Advise MPWWR in expansion plan for BCWUA programming.
- Advise MPWWR on Irrigation Management Transfer (IMT) issues and pilot program to be implemented under the MPWWR/USAID Trance IV benchmark program.

4.12 BCWUA Process Documentation

The documentation of processes in social organizations is critical for participants to maintain a history of their local institution, and for service entities such as the Irrigation Department to understand the nature of the organization. Process Documentation, therefore, was a major aspect of the implementation of this BCWUA work plan. The complete set of records for initial contact meetings, clustered branch canal reach meetings, and combined membership meetings for the three BCWUAs are attached as Appendices D-1 and D-2.

4.13 BCWUA Under-Secretarial Decrees

To formally attest the legitimacy of the new Branch Canal Water User Association, the Under-Secretary for MPWWR in the relevant Governorate issues a registration certificate on behalf of the Minister. This document, authorized by Ministerial Decree, is issued to the BCWUA upon submission of its membership charter and list, by-laws, and plan of action. Copies of the MPWWR Under-Secretarial decrees for Qemri, Bahr el Dahram and Balaqtar BCWUAs can be found in Appendix A of this report.

[6] International Network on Participatory Irrigation Management

4.14 Benchmark Work Plan

The benchmark work plan was developed in joint consultation with key units of MPWWR, and sets out a phased implementation schedule over the period August 1998 to June 1999.[7] The major landmarks in the work plan were:

- MPWWR established a Ministerial Action Team on Participatory Irrigation Management and provide orientation study tour and training to Action Team.
- MPWWR formally authorizes formation of Branch Canal Water User Associations at the selected sites.
- BCWUAs were organized and established at four selected sites.
- Collation of records and minutes of meetings with farmers on the four BCWUAs documenting the process of formation;
- Training of senior field staff, technicians and field agents in communication skills, BCWUA organizing methodologies, and participatory rural appraisal (PRA) techniques;
- Preparation branch canal O&M cost-sharing plans with two BCWUAs;
- Submission of benchmark report.

[7] The elements of the work plan were implemented accordingly, with the exception of the roundtable workshop on results and findings, which later was deemed unnecessary by the benchmark task group.

5. BCWUA Establishment and Implementation Results

5.1 Qemri Branch Canal

5.1.1 Basic Background Information

- *Situation*. Qemri Branch Canal branches off of the Saidiya Canal, with its off-take at point 7.15 km on the left bank. Qemri Canal bisects the Abou Hamad, Fakous and El Korin areas of Sharkaiya Governorate.
- *Length and Discharge*. The branch canal 19.5 km, and it discharges 4 m3/Sec from the main canal. This discharge is supplemented by the discharge of water from ten wells along the reach that lies between point 6.5 km and 14.0 km of the branch canal. Continuous flow has been implemented, but is not wholly reliable as yet.
- *Command Area Served*. The command area of Qemri Branch Canal is 7,500 feddans.
- *Farmer Households*. There are 3,500 farmers served by the branch canal.
- *Crop Types*: wheat, maize, peanuts, vegetables, berseem.
- *Mesqas*. 80 of the total 85 mesqas of Qemri have been improved under the IIP program and are presently functioning under their respective WUAs.
- *Industrial Activity*: 1 commercial fodder production factory
- *Irrigation Method and Rotation*: Single point lift pumping on all mesqas.
- Continuous flow (irregular)
- *Major Problems:* Absence of reliable and predictable continuous flow.

5.1.2 Process Chronology of Qemri BCWUA Implementation

- An implementation workshop held on 11 Nov 98 at Sharkaiya IIP office in Zagazig, with the Director General IIS, EPIQ team and IAS General Director, IIS and IAS engineers, and Irrigation Department engineers, and some field agents. Strategy and work plan was developed, with designation of field team tasks tied to an implementation timeline. The work plan targeted completion of BCWUA formation by April 15, 1999.
- Qemri branch canal was divided into 3 hydrological reaches:
  - Head Reach 0.0 km to 10.5 km
  - Middle Reach 10.5 km to kilo16
  - Tail Reach 16 km to end.

Each reach was determined to have an appropriate number of persons.

- A list of local influential persons and traditional leaders was prepared, including assembly leaders and other political representatives.
- Individual meetings with local influential persons and local council members were held between December 1998 and January 1999.

- Ten group meetings were held during February and March to orient farmers toward BCWUA objectives and to identify potential BCWUA representatives.
- In April, 13 reach representatives were nominated to the Executive Council, including the district engineer as an ex-officio member in standing. In its first collective decision, the Executive Council voted to increase the number of council members to 15.
- The members of the Qemri Branch Canal WUA Executive Council are:

    1) M. Hussein Mohammad, Chairman
    2) Mohsil Abdel Aati, Deputy Chairman
    3) Ibrahim Mohammad, Secretary
    4) M. Ali Assan, Treasurer

    - Members at Large:
        1) M. El Kamri
        2) Sobha Ibrahim
        3) Shakhada Ali
        4) Ismail Abdel Aati
        5) M. Essein Ayat
        6) M. Salem
        7) M. Abou El Qasm
        8) Ali Mukhmil
        9) Hussein Abdel Fattah

    - BCWUA Advisor:
        1. Sayed Manour, District Engineer

- Regular meetings are held the first Tuesday of each month at the IAS room in the IIP building, Zagazig

The process of forming the BCWUA on Qemri Canal is documented in Appendix D-1 by records of all meetings and milestones.

5.2 Bahr el Dahram Branch Canal

5.2.1 Basic Background Information

- *Situation*. Bahr el Dahram branch canal is on the El Bohia Canal, with its off-take at point 10.0 km on the right bank. Bahr el Dahram branch canal is administered by the Deyarb Negm Irrigation District and crosses through Dakhlaiya and Sharkaiya Governorates.
- *Length and Discharge*. The branch canal has a total length of 11. km. long, and it discharges 4 m^3/Sec from the main canal.
- *Command Area Served*. The command area of Bahr el Dahram Branch Canal is 6,400 feddans.
- *Farmer Households*. There are approximately 5,800 farming households served by the branch canal.

- *Crop Types*: Summer: rice, cotton and maize. Winter: Wheat, berseem, vegetables, and broad beans (fuul).
- *Mesqas*. There are 13 mesqas on Bahr-el Dahram, none of which has been physically improved.
- Industrial Activity: None reported.
- *Irrigation Method and Rotation*: Direct lifting by private pumps from branch canal to mesqa, and mesqa to fields. Rotation is as follows: Summer: 4 days on and 6 days off. Winter: 5 days on and 10 days off.
- *Agricultural Cooperatives*. Eight agricultural coops serve the population of the command area.
- *Major Problems.* No major problems regarding water supply apart from seasonal shortage during May and June, supplemented by drainage water reuse and private wells.

5.2.3 Process Chronology of Bahr el Dahram BCWUA Implementation

- In the absence of an IAS field team in Mansoura, assistance was sought and received from the Irrigation Under-Secretary to augment the Irrigation Department field staff. He allocated staff sufficient to carry out the fieldwork, and one car exclusively to the field team for organizing the BCWUA. Four technicians were borrowed from the irrigation Department to work full-time with the project. Three motorcycles and fuel were allocated for the three technicians to be mobile in the field.
- In December 1998 a work plan was prepared for the establishment of a BCWUA on Bahr el Dahram Canal. Guidance in this process was provided by the IAS Director of Operations. In terms of methodology and incremental steps, the work plan for Bahr el Dahram branch canal closely mirrored that drawn up for the Qemri branch canal.
- Bahr el Dahram branch canal was divided into two hydrological reaches:

  - Reach 1: Head to 7.3 km point (juncture of the middle regulator)
  - Reach 2: From Middle regulator to the 11.7 km point (tail).

- The field team held twelve meetings with clusters of farmers after further dividing each reach into sub-sections. During these meetings farmers discussed general branch canal operations, maintenance and management, as well as issues and problems related to water delivery and head-to-tail equity. Farmers discussed implications of working together to solve these common issues, and met with farmers of Qemri Canal.
- Sixty-five separate meetings were held with local influential persons and traditional leaders, in addition to resident farmers employed in the public and private sector. These key individuals were given orientation in farmer-to-farmer awareness-building techniques, and accepted the role of agents of information transfer.

- Field engineers assigned to work on this branch canal received training in participatory rural appraisal and interpersonal communication techniques, conducted by the EPIQ team in January 1999.
- The schedule of reach meetings was completed from February to April 1999. These meetings were attended by farmers representing every farming community on the branch canal covering the entire command area.
- Following completion of these farmer cluster meetings, 13 members were elected to sit as the Executive Council: seven persons from Reach 1, and five persons from Reach 2, in addition to the District Engineer (ex-officio member).

    1) Hamid Ali El Bas, Chairman
    2) Md Abdel Wahab, Secretary
    3) Ibrahim Ali Youssuf, Treasurer

    - Members at Large:
        1) Salam el Hanfi Ahmed
        2) Ali Ali Almerwashi
        3) Ahmed Md Altayeb
        4) Omer Md. Abu Salama
        5) Sobia Ali Barakat
        6) Abdul Aziz Hafiz
        7) Sayed Abdul Maqsood
        8) Abdel Hakim El Sayed
        9) Md. Shafiq Ahmed

    - BCWUA Advisor:
        1) Abdou Ahmed, District Engineer

The Executive Council decided that regular monthly meetings would be held on the first Monday of each month in the District Irrigation office.

5.3 Balaqtar Branch Canal

5.3.1 Basic Background Information

- *Situation*. Balaqtar Branch Canal is on the Mahmoudia Canal, with its off-take at point 29.6 km on the left bank. Balaqtar branch canal is administered by the Kafr el Dawar Irrigation District and is located in El Behaira Governorate.
- *Length and Discharge*. The branch canal has a total length of 16.6 km, and it discharges 6.25 m^3/Sec from the main canal.
- *Command Area Served*. The command area of Balaqtar Branch Canal is 11,500 feddans.
- *Farmer Households*. There are approximately 5,500 farming households served by the branch canal.

- *Crop Types*: Summer: rice, cotton, vegetables and maize. Winter: wheat, berseem, vegetables, caraway, and broad beans.
- *Mesqas*. There are 95 mesqas on Balaqtar, 41 of which have been physically improved under the USAID funded IIP program. An additional 54 mesqas are currently under construction under the World Bank financed IIP follow-on project.
- *Industrial Activity*: There is one fodder plant located at the tail of the branch canal.
- *Irrigation Method and Rotation*: Single point lift pumping on all improved mesqas. Continuous flow (adequate reliability).
- *Agricultural Cooperatives*. Four agricultural coops serve the population of the command area.
- *Major Problems.* Year-round weed infestation, primarily water hyacinth, results in obstruction of water flow.

5.3.2 Summary Process Chronology of Balaqtar BCWUA Implementation

- In November 1998 the IAS Director General and members of the EPIQ team introduced the concept of the BCWUA to the Director General of the IIP in Damanhour. The latter officer designated a team from the IAS and IIP staff in Damanhour to work for BCWUA formation on the Balaqtar branch canal.
- The first task of the designated BCWUA organization team was to prepare a work plan covering the period December 1998 to April 1999. The IAS Director of Operations provided technical guidance and orientation to the work plan preparation process and assisted in tailoring the plan to the specific exigencies of Balaqtar.
- Work in organizing the BCWUA was distributed among the designated IIP staff, and a resource pool allocation was determined (e.g. sharing of transport, secretarial staff, field engineers, technicians and field agents).
- Approximately 500 key persons and influential farmers living on Balaqtar and in the near vicinity were identified. Between December 1998 and the end of January 1999 the field team met with of these persons through 135 separate meetings to introduce the concept of the BCWUA and to determine the level of interest. In addition, the team was able to determine to what extent it could utilize the resources of local influential persons in the overall organizing process.
- The meetings with individual farmers and local leaders revealed unanimous consent for establishing the BCWUA on Balaqtar, general agreement about the need to participate regularly in branch canal O&M.
- The farmers consistently reiterated that if the BCWUA is to take on the larger share of responsibility for O&M of the branch canal, some type of maintenance / meeting / equipment storage center is needed.
- Farmers were of the view that as a necessary part of the BCWUA agreement, the Irrigation Department must be able to guarantee regular and continuous flow to the branch canal. (Both the farmers and the Irrigation Department

authorities accepted that while continuous flow is part of the IIP package of services, in reality it has not been implemented efficiently or predictably.)

- For organizing purposes, the Balaqtar branch canal was divided into five hydrological reaches, each reach demarcated by the presence of a new automatic control regulator.
- It was proposed by most of the farmers that each 1,000 feddan under irrigated command be represented by 1 member on the Executive Council.
- The IAS senior officers in Damanhour provided on-the-job training to field agents in improving communication skills during the organizing process.
- Following the individual meetings with farmers, a series of thirteen "hydrological reach" meetings was conducted with groups of farmers. In the last of each of the "reach" meetings, one person was elected to represent the cluster on the BCWUA Executive Council.
- At the first Executive Council meeting it was unanimously agreed to add an additional person to the Executive Council. This was done in the interest of establishing more equitable and evenly distributed farmer representation on the Executive Council.
- Regular meetings of the Executive Council are scheduled for the second Saturday of each month at the IIS office in Damanhour.
- The members of the Balaqtar Branch Canal WUA Executive Council are:

    1. Md Salah el Masr, Chairman
    2. Md Hussein Awat, Vice Chairman
    3. Abdel Azim Abdel Ghani, Secretary
    4. Md. Ahmed Hamada, Treasurer

    - Members at Large
        1. Anwar Musa Abdel Hamid
        2. Abdalla Abdel Karim
        3. Sayed Zaki
        4. Essafi Abda Rabou
        5. Md Ahmed Abdel Rahman
        6. Ragab Md Enagaf
        7. Salah Abde Tawar
        8. Mustafa Awat
        9. Md Abdel Aati

    - BCWUA Advisors:
        1. Abbas Mohammad Abbas, District Engineer
        2. Fatteh Mansour, Drainage Engineer

5.4 El Reity Canal

Work on the El Reity Canal WUA is in the development phase, and a report on the implementation program there will be issued separately.

5.4.1. Basic Background Information

- *Situation*. El Reity Canal is located on the Sawahal Armant Canal with its off-take at point 8.2 km on the left bank. El Reity Canal is administered by the Armant Irrigation District under the Qena Irrigation Department.
- *Length*. The canal has a total length of 5.63 km, in addition to a branch of 1.5 km length.
- *Command Area Served*. The command area of El Reity Canal is a total of 2,050 feddans.
- *Farmer Households*. There are approximately 1,330 farming households served by the branch canal.
- *Crop Types.* Summer: sugarcane (65% of total cultivation) and maize. Sugarcane is cultivated on the basis of a 4 year on and 1 year off, cropping cycle. Winter: wheat, berseem, and vegetables.
- *Mesqas*. There are 28 mesqas on el Reity, none of which have been physically improved under any government scheme.
- *Industrial Activity.* There is one sugarcane processing unit near the tail reach of the main El Reity canal. There is also a fodder production plant located near the head reach.
- *Irrigation Method and Rotation*: Gravity flow.
- *Agricultural Cooperatives*. Two agricultural co-ops serve the population of the command area.

5.4.2 Process Chronology of El Reity BCWUA Implementation

Work on establishing a BCWUA at El Reity was initiated in April 1999, and will be documented in a subsequent report.

6. Branch Canal O&M Cost-Sharing Planning Process

The following is a brief overview of the branch canal cost-sharing rationale, process and results. The complete cost-sharing plan documentation can be found in Appendix B.

In order to improve overall irrigation system management in Egypt , farmers should gradually participate more fully in the operation and maintenance of their branch canals.. Increased farmer involvement, as well as cost-sharing is to be accomplished through the development of branch canal water users associations.

6.1 Cost-Sharing Program

The cost-sharing plan process proposes to utilize:

- O&M contracts for the BCWUA,
- earnings from contract work to be used by the BCWUA to develop its managerial, fiscal and record-keeping skills,
- a three-year developmental plan utilizing:
  - a five-year base value for determining the ceiling on O&M contract payments,
  - a negotiated process between GOE and the BCWUA that defines a unique cost-sharing plan for each BCWUA, based on the size and scope of the O&M contract, and
  - a memorandum of understanding between GOE and the BCWUA that is contractual in nature and covers the details of the cost-sharing plan. The memorandum will spell out procedures for financial transfers, responsibilities and transparency.

6.2 Rationale and Justification

Local participation of this nature is needed because of the anticipated gradual reduction in GOE resources available for branch canal O&M in the future. Irrigation system management can also be improved through the existence of BCWUAs, as they gradually develop water record-keeping capability to provide "real-time" aggregate reporting of local branch canal water demand. One can only imagine the benefits to national water resource planning if this “bottom-up” data assembling and reporting capability were to be developed in BCWUAs.

There are many social benefits to participation that cannot be easily quantified or measured in economic terms. It is always important to acknowledge, that whatever the social benefits, participation also imposes some costs to farmers in the form of time and other resources spent in these activities. In the initial stages, farmers must become more involved in branch canal management, with minimal opportunity costs to them, i.e. they should be reimbursed for participation in branch canal O&M which will allow them to

build up a small capital reserve for the BCWUA. This system should continue over several years until the farmers have sufficient economic resources and incentives to assume more managerial, fiscal and record-keeping responsibilities. It is believed that opportunity costs for such participation can be greatly minimized.

6.3 Requirements and Elements of the Cost-Sharing Plan

BCWUAs must be transparent in their management. They must:

- develop managerial, fiscal and record-keeping procedures that are open and detailed enough to ensure success in the cost-sharing program,
- have representative leadership,
- be fair and reasonable in their decisions and administration of resources,
- have by-laws, rules and regulations governing their activities, and
- be supported by a legal foundation.

There are eight basic elements to the cost-sharing program:.

- The farmers will be responsible for routine O&M contract work. The BCWUA is the contracting entity and thee contract work will be directed and overseen by the BCWUA. Farmers do not enter into contracts individually. They are employed by the BCWUA. Again, the purpose of moving from indirect (using private contractors) to direct (using BCWUAs) government support for branch canal O&M is to eventually minimize assistance to a level that both GOE and farmers can accept.
- Through their BCWUA, farmers will conduct O&M at a level suitable to their economic abilities, and will be reimbursed upon completion of the contracted work.
- The cost-sharing program uses a *five-year base value* for determining the annual level and ceiling of O&M costs. This base value is negotiated between GOE and the farmers. It represents the estimated annual cost of operating the branch canal, including potential overhead costs associated with public agency administration and salaries.
- The cost-sharing program uses a phased, three-year developmental plan for BCWUAs that can be redesigned and renewed at the end of a three-year period. The plan has some institutional performance targets associated with it. There are some modest penalties for failure to meet targets in the developmental plan. Each phase in the increased cost-sharing of the branch canal moves the local farming community toward greater responsibility of its management. This includes the development of managerial, fiscal, record-keeping and dispute resolution skills.
- The cost-sharing program provides a menu of different options to BCWUA development. The particular option utilized during this benchmark implementation is a three-year developmental plan, negotiated between the farmers and GOE.
- The cost-sharing plan is negotiated and finalized in a memorandum of understanding between farmers and GOE.
- Training and workshops for the farmers will be needed to implement the cost-sharing program. These should be implemented through a training plan executed by the IAS outreach team.

- The renewable three-year plan also phases in a mesqa improvement package in areas where mesqa improvement packages are being introduced to farmers through GOE. The program does not entirely depend upon the availability of an improvement package, but a mesqa improvement package will most likely move the farming community more quickly in the direction of BCWUA development, if it is carefully linked to developmental targets. When available, mesqa improvement is an important additional economic incentive to the overall cost-sharing program.

More than one three-year plan might be needed. However, it is anticipated that some BCWUAs will reach some of the more important managerial, fiscal and record-keeping targets by the end of the first three-year plan. Factors that determine the level of BCWUA development will be tracked and measured as a matter of routine process documentation.

The proposed program will greatly minimize up front opportunity costs, giving farmers time to adjust to the new regime and to assess its benefits. Re-direction of GOE funds from private contractors to BCWUAs for branch canal O&M work will be the basic economic incentive, as well as governmental policy change needed. It is believed that this can be accomplished with minimal administrative adjustments.

6.4 Cost-Sharing Plan Preparation

In launching the O&M cost-sharing planning process MPWWR held focus group workshops on May 26 and 27 for Bahr el Dahram and Qemri branch canals, respectively. The expected output of these workshops was arrival at consensus for O&M cost-sharing between the members of the BCWUA and the Irrigation Department. It is understood that these plans will likely not be implemented until such time as the procedures for GOE contracting likewise are amended to allow BCWUAs work as contractors. The plans have the following structure breakdown of O&M:

- tasks/activities which the BCWUA will undertake voluntarily,
- tasks/activities which the BCWUA will be contracted to carry out by the Irrigation Department, and
- tasks/activities which the Irrigation Department will continue to execute directly.

6.4.1 Cost-Sharing Plan for Qemri and Bahr el Dahram Branch Canals

The cost-sharing plan targets costs associated with the operation and maintenance of branch canals in Egypt. The program assumes a high level of mutual cooperation between the MPWWR and the BCWUAs to share in these costs.

The plans also assume that BCWUAs will be governed by their executive council, will have by-laws, will be a legal entity, and will maintain a small office and staff, including possibly, patrollers trained to measure water and maintain records. Both BCWUAs agreed to levy a small annual O&M assessment to cover costs, in addition to receiving continued government financial assistance at some level.

Farmers presently do not contribute to branch canal O&M, either through an assessment or through voluntary labor mobilization. To reduce some of the costs of doing so, the MPWWR will allow these associations to enter into *O&M contracts* with the government to do annual O&M, rather than using private contractors do the work.

Both BCWUAs have indicated in their willingness to enter into contractual agreements with MPWWR. As the association strengthens, it will gradually take on more O&M responsibilities, reducing the annual cost to the government in maintaining branch canal systems throughout Egypt. At present, the program is not designed to reduce actual outlays made by the government, but rather to give *added value* to these outlays.

Added value is based on the assumption that BCWUAs will do higher quality work than that performed by private contractors. This is an empirical issue, but if, as expected, it is substantiated, it will stretch current government expenditures further and reduce the rate of depreciation of canal systems over time. In addition, there are many social benefits suggested from this program that cannot easily be measured in economic terms. Among these are more local control, improved systemic oversight, reduction in water disputes, and improved relations among farmers.

The cost-sharing plan presented in this report is framed in economic and business terms, and uses accepted accounting and fiscal management standards to assess the value and determine success of the plan. The plan entails the following steps:

- formation of a BCWUA;
- focus groups on cost-sharing planning (including workshops);
- developing the five-year "base value" of O&M costs (this is a negotiation process);
- developing the association's three-year plan, including participation in O&M contracts;
- defining and implementing performance targets in the three-year plan;
- BCWUA satisfactory completion of O&M contracts;
- cost-sharing plan impact evaluation.

6.4.1.1 Qemri BCWUA Cost Sharing Plan

A. <u>Estimated Cost Savings to Government of Egypt</u>

The policy of allowing the to perform O&M contract work for the Ministry is designed to improve the utilization of O&M funds, and to obtain greater benefits from these expenditures. Government funds will administered more efficiently, the rate of depreciation of Government canal assets will be reduced, and farmers will be offered a package economic incentives to assume more responsibility for the protection and management of these assets.

Anticipated Savings to Government

Awarding O&M contracts to BCWUAs, and at approximately the current cost rate, will allow the association to build up a reserve account. This reserve account can be used to

improve the irrigation system, either physically or through more full-time management. he association will build up a reserve account because it operates at cost. It does not charge the government an overhead cost or profit margin. The economic value of this policy will be measured by the rate of formation of the reserve account, as well as the additional O&M work undertaken by the association with this capital savings.

Awarding O&M contracts to canal associations is expected to reduce the rate of depreciation of Government assets over time. This is accomplished by empirically verifying that the BCWUA does more careful work, thereby minimizing the cost of future rehabilitation as well as increasing the length of time before maintenance needs to be repeated. Farmers, represented by their BCWUA council, depend upon the branch canal for their livelihood, while the private contractors normally doing the same O&M do not.

The current cost-sharing plan presumes that the BCWUA will introduce an annual assessment as their contribution toward operating and maintaining the branch canal. The BCWUA benefits from the new policy on O&M contracts, in return for agreeing to initiate this assessment. This assessment represents additional revenue to increase patrolling of the canal and to catch up on critical deferred maintenance. Such activities as these undertaken by the BCWUA also reduces the rate of depreciation of the irrigation system

BCWUA participation also will reduce costs to government associated with efforts to organize WUAs at the mesqa level. Initially, a BCWUA will be developed, and after a certain point in time will begin to assist IAS and IIP staff to organize the mesqa-level WUAs. Over time this will reduce the required number of IAS and IIP field staff needed to form these WUAs.

B. Five-year "Base Value" of O&M Costs

This value is based on the documented average cost of operating and maintaining the branch canal over the previous five-years. Negotiations between the Ministry and the BCWUA council would concur after an examination of cost records, leading to an agreed upon base value. This base value is the basis of contract reimbursements to the BCWUA by the Ministry upon completion of O&M work performed by association. Private contractors have been doing most of the O&M work up to this time. Records of payments to private contractors will be reviewed in this process. The association would be awarded a reimbursement upon fulfillment of contract specifications.

Table 1. Average Annual O&M Cost Per Year by Expense Account

	Estimates
	(LE)
401- Salaries - canal patrolling (supervision of mesqa demand and canal reaches)	5,100
402- Salaries - office clerk/patrolman (fiscal and water delivery record keeping)	2,550
403- Wages - casual labor	1,200
404- Equipment and supplies (trash rakes, tools)	200
405- Council stipend (for meetings, trips, coordinating activities)	200
406- Special services (auditing, consultative)	200
407- Rental fees (for small storage facility or office)	2,400
408- Vehicle maintenance (small motorcycle, tractor)	3,000
409- Fuel (tractor, motorcycle)	4,000
410- Weed control (machine)	2,500
411- Weed control (manual)	2,500
412- Dredging - trash removal (machine)	12,000
413- Dredging - trash removal (manual)	6,600
414- Pitching	1,000
415- Rip rap	1,000
416- Maintenance of bridges	1,000
417- Drainage	1,000
418- Depreciation/Contingency fund	0
419- Mesqa WUA development	1,000
420- Bank fees	20
421- Other expenses	10
Total annual cost of branch canal operation and maintenance	**48,680**

C. Three-year Association Development Plan

The BCWUA evaluates its capability in meeting various expense items. Some expense items would be fully reimbursable by the Ministry, while other items would be assumed by the association without anticipated reimbursement. The development of the three-year plan requires the establishment of an accurate "base value." One-hundred percent (100%) means that the BCWUA would assume all of the costs of the expense account. Zero percent (0%) means that the association will not assume any of the costs of the expense item. The willingness of the BCWUA to enter into O&M contracts for any of these expense items is not reflected on this page. That is shown clearly in section D of this plan.

Table 2. Proposed BCWUA Cost Sharing by Expense Account

Proposed BCWUA Cost Sharing by Expense Account	**Year 1**	**Year 2**	**Year 3**
(The BCWUA percentage is financed through its own O&M assessment)	%	%	%
401 - Salaries - canal patrolling	50	50	100
402 - Salaries - office clerk/patrolman	50	50	100
403 - Wages - casual labor	100	100	100
404 - Equipment and supplies	100	100	100
405 - Council stipend	100	100	100
406 - Special services	100	100	100
407 - Rental fees	0	0	0
408 - Vehicle maintenance	100	100	100
409 - Fuel	100	100	100
410 - Weed control (machine)	0	0	0
411 - Weed control (manual)	0	0	0
412 - Dredging - trash removal (machine)	0	0	0
413 - Dredging - trash removal (manual)	0	0	0
414 - Pitching	0	0	0
415 - Rip rap	0	0	0
416 - Maintenance of bridges	0	0	0
417 - Drainage	0	0	0
418 - Depreciation/Contingency fund	0	0	0
419 - Mesqa WUA development (task already completed)	0	0	0
420 - Bank fees	100	100	100
421 - Other expenses	100	100	100

Example #1 - For account #401 above, which is estimated to cost LE 5100 per year (see base value in section C of this plan), the association agrees to cover 50% in year 1 and 2. This represents all the resources it can bring to bear on the expense item, and will be paid out of a small annual assessment. The other 50% would be covered by the MPWWR but as shown in the next section the BCWUA would contract with MPWWR to perform this remaining 50%. In other words, it would do this remaining 50% as part of an O&M contract. In year 3, the

BCWUA would feel capable of assuming all of the cost of this particular expense item, probably as a function of wanting to exercise more local control.

Example #2 - For accounts #412-413, which are estimated to cost LE 12,000 and LE 6,600 per year (see base value in previous section), the BCWUA has not agreed to cover any of the cost. They are large expense items, and #412 involves the use of heavy equipment which the association does have access to. However, as can be seen in the following section, the BCWUA feels capable of at least entering into an O&M contract for doing some of the manual dredging and trash removal

D. Projected Association Revenue from O&M Contracts

The Ministry has indicated a willingness to allow BCWUAs to perform O&M contracts in place of the use of private contractors. BCWUAs have indicated a willingness to do this. However, the mechanics of this need to be worked out. The Qemri Branch Canal Water User Association has indicated a willingness to do the following. It is important to view the anticipated reimbursements received by the BCWUA from the Ministry for fulfilling O&M contracts as revenue for the BCWUA.

Table 3. O&M Contract (and BCWUA revenue) by Expense Account

	Year 1	Year 2	Year 3	
401 - Salaries – canal patrolling	2,550	2,550	0	
402 - Salaries – office clerk/patrolling	1,275	1,275	0	
403 - Wages – casual labor	0	0	0	
404 - Equipment and supplies	0	0	0	
405 - Council stipend	0	0	0	
406 - Special services	0	0	0	
407 - Rental fees	0	0	0	
408 - Vehicle maintenance	0	0	0	
409 - Fuel	0	0	0	
410 - Weed control (machine)	2,500	2,500	2,500	
411 - Weed control (manual)	2,500	2,500	2,500	
412 - Dredging – trash removal (by machine)	0	0	1,200	
413 - Dredging – trash removal (manual)	2,000	2,000	2,000	
414 - Pitching	1,000	1,000	1,000	
415 - Rip rap	0	0	100	
416 - Maintenance of bridges	1,000	1,000	1,000	
417 - Drainage	0	0	100	
418 - Depreciation/Contingency fund	0	0	0	
419 - Mesqa WUA development	0	0	0	
420 - Bank fees	0	0	0	
421 - Other expenses	0	0	0	
Total O&M revenue LE	**12,825**	**12,825**	**10,400**	**36,050**

This worksheet indicates that the BCWUA has agreed to perform certain O&M contract work, for which it will earn revenue. Above, it shows that the association will earn LE 36,050 through O&M contracts over the three-year period. Some of this revenue goes to paying whoever conducted the work in the name of the BCWUA. A small percentage of the O&M contract revenue (15%) goes to account #418, which is a depreciation/contingency fund.

E. Year by Year Totals - Revenue and Expenses

The BCWUA operates as a nonprofit association, meaning that it operates at cost. A percentage of O&M revenue is allocated by the BCWUA to a depreciation account or contingency fund (#418). The BCWUA is able to do this because it does not charge the Ministry an overhead cost or profit margin. The #418 account represents savings to the Ministry. This is in the form of added value from additional O&M work that the association will fund through this account in the future. This represents "added value" above what the private contractors would provide.

Table 4. Revenue and Expense Accounts

Revenue Accounts					
301 - O&M Revenue (Ministry reimbursement to BCWUA)		12,825	12,825	10,400	
302 - BCWUA Assessments (LE 1.50 per feddan)		10,500	10,500	10,500	
303 – Jobbing (work performed by BCWUA for mesqas)		0	3,500	3,500	
304 - Contributions (Member voluntary labor)		39	0	2,549	
305 - Cash gifts, and donations				0	
306 - Grants (Government, NGO, or private sector)				0	
Total revenues	**LE**	**23,364**	**26,825**	**26,949**	**77,138**
Expense Accounts					
401 - Salaries – canal patrolling		5,100	5,100	5,100	
402 - Salaries – office clerk/patrolman		2,550	2,550	2,550	
403 - Wages – casual labor		1,200	1,200	1,200	
404 - Equipment and supplies		200	200	200	
405 - Council stipend		200	200	200	
406 - Special services		200	200	200	
407 - Rental fees		0	0	0	
408 - Vehicle maintenance		3,000	3,000	3,000	
409 - Fuel		4,000	4,000	4,000	
*410 - Weed control (machine)		2,125	2,125	2,125	
*411 - Weed control (manual)		2,125	2,125	2,125	
*412 - Dredging - trash removal (machine)		0	0	1,020	
*413 - Dredging - trash removal (manual)		1,700	1,700	1,700	
*414 - Pitching		850	850	850	
*415 - Rip rap		0	0	100	
*416 - Maintenance of bridges		850	850	850	
*417 – Drainage		0	0	90	
418 - Depreciation/Contingency (15% of O&M revenue)		1,924	1,924	1,560	
419 - Mesqa WUA development		0	0	0	
420 - Bank fees		20	20	20	
421 - Other expenses		10	10	10	
Total expenses	**LE**	**26,054**	**26,054**	**26,900**	**79,008**
Excess of revenues over expenses	**LE**	**(2,690)**	**771**	**49**	**(1,870)**

The accounts marked (*) show the expense after crediting 15% to account #418. Notice that there is a modest negative balance in the revenue. This would indicate a possible need to increase the annual assessment slightly to create a zero balance, which is the objective of a nonprofit association.

F. Three-year Totals – Revenue and Expenses

Table 5. Revenue and Expense Accounts

Revenue Accounts		
301 - O&M contracts (Ministry reimbursements to BCWUA)	36,050	
302 - BCWUA assessments (LE 1.50 per feddan)	31,500	
303 - Jobbing (work performed by BCWUA for mesqas)	7,000	
304 - Contributions (voluntary labor by BCWUA members)	2,588	
305 - Cash gifts and donations	0	
306 - Grants (government, NGO or private sector)	0	
Total revenues		**LE77,138**
Expense Accounts		
401 - Salaries – canal patrolling (900 man days)	15,300	
402 - Salaries – office clerk/patrolman (450 man days)	7,650	
403 - Wages – casual labor (900 man days)	3,600	
404 - Equipment and supplies (trash rakes, tools)	600	
405 - Council stipend (for meetings, trips, coordinating activities)	600	
406 - Special services (auditing, consultative)	600	
407 - Rental fees (for small storage facility or office)	0	
408 - Vehicle maintenance (small motorcycle, tractor)	9,000	
409 - Fuel (tractor, motorcycle)	12,000	
410 - Weed control (machine)	6,375	
411 - Weed control (manual)	6,375	
412 - Dredging – trash removal (machine)	1,020	
413 - Dredging – trash removal (manual)	5,100	
414 - Pitching	2,550	
415 - Rip rap	100	
416 - Maintenance of bridges	2,550	
417 - Drainage	90	
418 - Depreciation/Contingency fund	5,408	
419 - Donations of time for mesqa WUA development	0	
420 - Bank expenses	60	
421 - Other expenses	30	
Total expenses LE		**79,008**
Excess of revenues over expenses LE		**(1,870)**

G. Statement of Assets and Liabilities

Table 6. Assets and Liabilities

Branch Canal Association Assets (current assets)		
Cash (from expense account #418)	1,241	
Accounts receivable (Ministry reimbursements forthcoming)	0	
Inventory (materials, supplies)	200	
Savings account (from expense account #418)	1,000	
Prepaid expenses	0	
Reserve account (Remaining balance of expense account #418)	3,167	
Total current assets		**5,608**
Government Assets (fixed assets)		
Land and buildings	350,000	
Equipment	12,000	
Other fixed assets	3,000	
(Less depreciation)	(50,000)	
Total fixed assets		**315,000**
Other Assets		
Long-term investments	0	
Enter other assets here	0	
Enter other assets here	0	
Total other assets		0
Total assets		**320,608**
Liabilities and Equity		
Current Liabilities		
Accounts payable	1,870	
Short-term loans payable	0	
Other current liabilities	0	
Total current liabilities		**1,870**
LONG-TERM LIABILITIES		
Long-term loans payable	0	
Other long-term liabilities	0	
Total long-term liabilities		0
Equity		
Net equity	0	
Retained earnings	318,738	
Total equity LE		**318,738**
Total liabilities and equity		**LE 320,608**

H. Detailed Description of Cost-Sharing Plan Expense Accounts

Expense Account Numbers

401-2 Costs associated with these two expense accounts are based on local rural labor rates for semi-skilled people operating small hydraulic equipment, driving a vehicle, and with some primary education. They are not based on salary levels for such comparable work within the Irrigation Department. Specific activities associated with this account have not been completely defined at this time. As part of the cost sharing performance targets outside of O&M contracts with GOE, the BCWUA would investigate its ability to hire one or two branch canal patrollers to maintain records and supervise (1) the level of water in branch canal reaches, (2) rates and timing of mesqa pumping and, (3) conducting light maintenance work. BCWUA patrollers will be full time positions. BCWUA office management might be a part-time position (limited hours of a small BCWUA office during the day). The cost of branch canal patrollers is estimated at 15 to 20 LE per day in rural areas for a semi-skilled employee able to operate a tractor, small hydraulic equipment, make repairs to motorcycles, and observing and recording water measurements after proper training. This would be for approximately 300 days a year.

The example shows that during the first two years, the BCWUA will be reimbursed by the Ministry for expenditures incurred in these accounts. For the third year, the BCWUA will assume the full cost of these accounts. Also, during the first two years, a patroller will be hired at part-time, rather than at full time. This is in keeping with some expected need for the BCWUA to explore the value and use of patrollers.

403 Specific activities and costs associated with this account include the hiring of casual labor for miscellaneous O&M tasks in excess of those itemized under other accounts below. As an example, Account #103 would generally not include casual labor hired by the BCWUA to perform work associated with an Irrigation Department O&M contract undertaken by the association. Account #103 represents O&M work performed by the BCWUA on its own, without any reimbursement from the Ministry. The cost of casual laborers is estimated at 8 LE per day in rural areas.

404 This account defines BCWUA expenditures to maintain a small store of provisions for branch canal maintenance, including essential equipment for removing trash, shovels, lumber, rebar, gabion, spare parts for mesqa pumps, pipe, cement and an assortment of carpentry and masonry tools. This store of equipment and goods would be built up over time, with purchases coming from the BCWUA capital reserve account or annual assessments.

405 This account represents costs incurred by council members for attending meetings, and time spent by them in providing special assistance to individual farmers to (1) resolve special problems that cannot be addressed by the BCWUA

patrollers, (2) assisting mesqa associations in their formation, or (3) addressing issues associated with the planning of land leveling in mesqa areas, etc. The importance of Account #105 is in keeping with the expressed desire by farmers in focus groups to solve water problems locally whenever possible, and without the intervention of local police or the Ministry.

406 This account includes possible costs associated with the auditing of BCWUA records, and legal requirements associated with BCWUA registration, other government or Ministry requirements, etc. It is not anticipated at this time that Ministry funds would be available for such expenditures. Furthermore, such expenses may be minimal initially.

407 This account would be defined by expenses associated with renting small office, storage facility, etc. Rental fees for a small 16' x 16' storage shed might be about 200 LE per month in rural village areas.

408 This account is associated with costs in maintaining vehicles, such as motorcycles for patrollers, a tractor, carts, etc. Maintaining a motorcycle, including daily mileage of about 30 kilometers, is estimated at 20 LE per day. The cost of a 1 ton, 4-cylinder pickup truck would be about 100 LE per day, including mileage. This cost estimate would be for a BCWUA tractor as well.

This expense account shows the cost of all fuel, whether for vehicles or other purposes, consumed by the BCWUA while conducting expense account activities it undertakes on its own. This would generally not include fuel costs under O&M contracts.

410 This account is apparently of great interest to farmers. During focus groups, farmers indicated the desire to conduct weeding themselves (through the association), rather than having private contractors do this work. These accounts would be the source of major accounts for BCWUA contracting with the Ministry.

412

413 This is generally the account with the highest costs. In focus groups, farmers have indicated that all costs associated with canal dredging, presumably including labor as well as machinery costs, would not be undertaken by the BCWUA through O&M contracts. This is because of the need for large earthmoving equipment and associated skills. However, it is not clear if this means that farmers, through their BCWUA, would be unwilling to engage in O&M contracts for manual dredging, as opposed to mechanical dredging. In any event, only minimal costs associated with these accounts are borne by the BCWUA during the third year. This reflects some growing capability over time of BCWUA participation in this account category.

414 This account is represented by labor and possible fuel costs associated with this annual activity.

This account represents unique costs of purchasing, or otherwise acquiring, and transporting rip-rap. Again, nominal participation of the BCWUA in the third year to reflect growing capability.

416 Focus groups with farmers indicated a general unwillingness to participate in this account. Costs borne by the BCWUA for conducting minor maintenance on bridges, or the value of O&M contracts undertaken by the association occurs at a very minimal level in year three. This reflects an expected growing capability of the BCWUA to participate in this account.

This account may be incurred or assumed by BCWUAs in the future, and may have several cost items including, removal of trash and weeds, supervision of drains, pumping, and repair or installation of drains (see discussion in report).

418 This account is charged against the revenue collected from O&M contracts. It is used as a capital reserve fund for the association.

419 Mesqa WUA development can be assisted by the branch canal association. When this occurs it is a cost item for the association.

420 Fees charged for a checking account.

421 Other expenses.

6.4.1.2 Bahr el Dahram BCWUA Cost Sharing Plan

A. Estimated Cost Savings to GOE

The policy of allowing the branch canal associations to perform O&M contract work for the Ministry is designed to improve the allocation of these funds and to obtain greater benefits from these expenditures. Government funds are administered more efficiently, the rate of depreciation of canal assets is reduced, and farmers are given much needed economic incentives to assume more responsibility for the protection and management of these assets

Anticipated Savings to Government

Awarding O&M contracts to the Bahr el Dahram BCWUA, and at approximately the current cost rate, would allow the association to build up a reserve account over time. This reserve account can be used to further improve the irrigation system, either physically or through more full time management with patrollers, etc. The association can build up a reserve account because it operates at cost. It does not charge the government an overhead cost or profit margin on the O&M contracts. The economic value of this policy can be measured by the rate of formation of the reserve account, as well as the additional O&M work on previously deferred maintenance undertaken by the association with this capital fund.

Awarding O&M contracts to BCWUAs is expected to reduce the rate of depreciation of these government assets over time. This is accomplished in the following way. Although it needs to be empirically verified, it is believed that the association will do more careful work, thereby minimizing the cost of future rehabilitation as well as increasing the length of time before maintenance needs repeating. Farmers, represented by their association council, depend upon the canal for their livelihood, while the private contractors normally doing the same O&M contract do not.

The current cost-sharing plan recommends that the association introduce an annual assessment as its contribution toward operating and maintaining the branch canal. The association makes benefit of the new policy on O&M contracts, in return for agreeing to initiate this assessment; however small it is. This assessment represents additional revenue to increase patrolling of the canal, and to catch up on critical deferred maintenance. Activities such as these undertaken by the association also reduces the rate of depreciation of the irrigation system.

Branch canal associations can minimize government costs associated with efforts to organize smaller associations at the mesqa level. Initially, a branch canal association is developed and at a certain point in time begins to assist Ministry staff in organizing smaller mesqa associations. Over time, this will gradually reduce the required number of Ministry staff needed to form these mesqa groups.

B. Five-year "Base Vale of O&M Costs

This is a negotiated value, based on the documented average cost of operating and maintaining the branch canal over the previous five-years. Negotiations between the Ministry and the BCWUA council occur after an examination of cost records, leading to an agreed upon base value. This base value is the basis of contract reimbursement rates to the BCWUA by the Ministry upon completion of O&M performed by the association. Private contractors have been doing most of the O&M work up to this time. Records of payments to private contractors could be consulted in this process. The association would be awarded a reimbursement upon fulfillment of contract specifications.

Table 7. Average Annual Bahr el Dahram O&M Cost per Year, by Expense Account

	Estimates (LE)
401 - Salaries - canal patrolling (supervision of mesqa demand and canal	5,100
402 - Salaries - office clerk/patrolman (fiscal and water delivery record keeping)	2,550
403 - Wages - casual labor	1,500
404 - Equipment and supplies (trash rakes, tools)	300
405 - Council stipend (for meetings, trips, coordinating activities)	300
406 - Special services (auditing, consultative)	200
407 - Rental fees (for small storage facility or office)	2,400
408 - Vehicle maintenance (small motorcycle, tractor)	2,000
409 - Fuel (tractor, motorcycle)	3,000
410 - Weed control (machine)	4,000
411 - Weed control (manual)	3,500
412 - Dredging - trash removal (machine)	14,000
413 - Dredging - trash removal (manual)	8,600
414 – Pitching	2,000
415 - Rip rap	2,000
416 - Maintenance of bridges	1,000
417 – Drainage	1,000
418 - Depreciation/Contingency fund	0
419 - Mesqa WUA development	5,000
420 - Bank fees	20
421 - Other expenses	10
Total annual cost of branch canal operation and maintenance LE	**58,480**

C. Three-year Bahr el Dahram Development Plan

The BCWUA evaluates its capability in meeting various expense account items. Some expense items would be covered by the Ministry, as in the past, while other items would be assumed by the association. One-hundred percent (100%) means that the BCWUA would assume all of the costs of the particular expense account. Zero percent (0%) means that the association will not assume any of the costs of the expense items. Fifty percent (50%) would mean that the Ministry would cover the remaining 50% of expected cost The willingness of the BCWUA to enter into O&M contracts for any items they do not meet one-hundred percent of the cost on is shown on the next page.

Table 8. Proposed Bahr el Dahram BCWUA Cost Sharing, by Expense Account

	Year 1	Year 2	Year 3
(The BCWUA percentage is financed through its own O&M assessment)	%	%	%
401 - Salaries - canal patrolling	0	0	50
402 - Salaries - office clerk/patrolman	0	50	50
403 - Wages - casual labor	0	0	25
404 - Equipment and supplies	100	100	100
405 - Council stipend	100	100	100
406 - Special services	0	0	0
407 - Rental fees	0	0	0
408 - Vehicle maintenance	0	0	100
409 – Fuel	0	0	100
410 - Weed control (machine)	0	0	0
411 - Weed control (manual)	0	0	0
412 - Dredging - trash removal (machine)	0	0	0
413 - Dredging - trash removal (manual)	0	0	0
414 – Pitching	0	0	0
415 - Rip rap	0	0	0
416 - Maintenance of bridges	0	0	0
417 – Drainage	0	0	0
418 - Depreciation/Contingency fund	0	0	0
419 - Mesqa WUA development (task already completed)	0	0	0
420 - Bank fees	100	100	100
421 - Other expenses	100	100	100

Example #1 - For account #401 above, which is estimated to cost LE 5100 per year (see base value on previous page), the association agrees to cover 50% in year 2. This all the resources it can bring to bear on the expense item, and will be paid out of a small annual assessment. The other 50% would be covered by the Ministry, but as shown on the next page, the association would contract with the Ministry in all three-years to perform this activity. In year 3, the association would feel capable of assuming 50% of the cost of this particular expense item, probably as a function of wanting to exercise more local control.

Example #2 - For accounts #412-413, which are estimated to cost LE 14,000 and LE 8,600 per year (see base value on previous page), the association has not agreed to cover any of the cost. They are large expense items, and #412 involves the use of heavy equipment which the association does have access to. However, as will be represented on the following page, the association feels capable of at least entering into an O&M contract for doing some of the manual dredging and trash removal (#413).

D. Projected Bahr el Dahram BCWUA Revenue from O&M Contracts

The Ministry has indicated a willingness to allow BCWUAs to perform O&M contracts in place of the use of private contractors. The BCWUAs have indicated a willingness to do this. The question is, what kinds of contract work will the BCWUA be willing to do. The Qemri Branch Canal Association has indicated a willingness to do the following. It is important to view the anticipated reimbursements received by the BCWUA from the Ministry for fulfilling O&M contracts as revenue for the association.

Table 9. O&M Contract (and association revenue) by Expense Account

	Year 1	Year 2	Year 3	
*401 - Salaries - canal patrolling	0	0	2,550	
*402 - Salaries - office clerk/patrolling	0	1,275	1,275	
403 - Wages - casual labor	0	0	0	
404 - Equipment and supplies	0	0	0	
405 - Council stipend	0	0	0	
406 - Special services	0	0	0	
407 - Rental fees	0	0	0	
408 - Vehicle maintenance	0	0	0	
409 - Fuel	0	0	0	
410 - Weed control (machine)	0	0	0	
411 - Weed control (manual)	3,500	3,500	3,500	
412 - Dredging - trash removal (machine)	0	0	0	
413 - Dredging - trash removal (manual)	4,300	4,300	4,300	
414 - Pitching	0	1,500	1,500	
415 - Rip rap	0	0	0	
416 - Maintenance of bridges	0	0	0	
417 - Drainage	0	0	0	
418 - Depreciation/Contingency fund	0	0	0	
419 - Mesqa WUA development	1,000	1,000	1,000	
420 - Bank fees	0	0	0	
421 - Other expenses	0	0	0	
TOTAL O&M revenue LE	**8,800**	**11,575**	**14,125**	**34,500**

This worksheet indicates that the branch canal association has agreed to perform certain O&M contract work, for which it will earn revenue. Above it shows that the association earned LE 34,500 through O&M contracts over the three-year period. Some of this revenue goes to paying whoever conducted the work in the name of the association. A small percentage of the O&M contract revenue (15%) goes to account #418, which is a depreciation/contingency fund.

For items marked (*), the Ministry would generally not award O&M contracts for these expense items if the association is unwilling to cover at least a small percentage of the cost. This is why no revenue from O&M contracts is earned from these items in year 1 and 2, whereas in year three there is some revenue earned.

E. Year by Year Totals – Revenues and Expenses

The Bahr el Dahram BCWUA operates as a nonprofit association, meaning that it operates at cost. A percentage of O&M revenue is allocated by the BCWUA to a depreciation account or contingency fund (#418). The BCWUA is able to do this because it does not charge the Ministry an overhead cost or profit margin. The #418 account represents a savings to the Ministry. This is in the form of added value from additional O&M work that the association will fund through this account in the future. This represents added value above what the private contractors would provide.

Table 10. Revenue Accounts

Revenue Accounts				
301 - O&M Revenue (Ministry reimbursement to BCWUA)	8,800	11,575	14,125	
302 - BCWUA Assessments (LE .50 per feddan)	3,200	3,200	3,200	
303 - Jobbing (work performed by BCWUA for mesqas)	0	0	0	
304 - Contributions (Voluntary labor by members)	0	0	0	
305 - Cash gifts, and donations	0	0	0	
306 - Grants (Government, NGO, or private sector)	0	0	0	
Total revenues	**12,000**	**14,775**	**17,325**	**44,100**
Expense Accounts				
401 - Salaries - canal patrolling	0	0	2,500	
402 - Salaries - office clerk/patrolman	0	1,275	1,275	
403 - Wages - casual labor	0	0	375	
404 - Equipment and supplies	0	0	150	
405 - Council stipend	300	300	300	
406 - Special services	0	0	0	
407 - Rental fees	0	0	0	
408 - Vehicle maintenance	0	0	1,000	
409 - Fuel	0	0	1,320	
*410 - Weed control (machine)	0	0	0	
*411 - Weed control (manual)	2,975	2,975	2,975	
*412 - Dredging - trash removal (machine)	0	0	0	
*413 - Dredging - trash removal (manual)	3,655	3,655	3,655	
*414 - Pitching	0	1,275	1,275	
*415 - Rip rap	0	0	0	
*416 - Maintenance of bridges	0	0	0	
*417 - Drainage	0	0	0	
418 - Depreciation/Contingency Fund (15% of O&M revenue)	1,320	1,736	2,119	
419 - Mesqa WUA development	0	0	0	
420 - Bank fees	20	20	20	
421 - Other expenses	10	10	10	
Total expenses	**8,280**	**11,246**	**16,974**	**36,500**
Excess of revenues over expenses	**3,720**	**3,529**	**351**	**7,600**

The accounts marked (*) shows their expense after crediting 15% to account #418. Notice that there is an anticipated positive balance in the revenue. This would indicate a possible need to have the association invest in some of the performance targets, although the final decision would be up to the association.

Table 11. Three-year Totals – Revenue and Expenses

Revenue Accounts		
301 - O&M contracts (Ministry reimbursements to BCWUA)	34,500	
302 - BCWUA assessments (LE .50 per feddan)	9,600	
303 - Jobbing (work performed by BCWUA for mesqas)	0	
304 - Contributions (voluntary labor contributed by association members)	0	
305 - Cash gifts and donations	0	
306 - Grants (government, NGO or private sector)	0	
Total revenues		**44,100**
Expense Accounts		
401 - Salaries - canal patrolling (900 man days)	2,500	
402 - Salaries - office clerk/patrolman (450 man days)	2,550	
403 - Wages - casual labor (900 man days)	375	
404 - Equipment and supplies (trash rakes, tools)	150	
405 - Council stipend (for meetings, trips, coordinating activities)	900	
406 - Special services (auditing, consultative)	0	
407 - Rental fees (for small storage facility or office)	0	
408 - Vehicle maintenance (small motorcycle, tractor)	1,000	
409 - Fuel (tractor, motorcycle)	1,320	
410 - Weed control (machine)	0	
411 - Weed control (manual)	8,925	
412 - Dredging - trash removal (machine)	0	
413 - Dredging - trash removal (manual)	10,965	
414 - Pitching	2,550	
415 - Rip rap	0	
416 - Maintenance of bridges	0	
417 - Drainage	0	
418 - Depreciation/Contingency fund	5,175	
419 - Mesqa WUA development	0	
420 - Bank expenses	60	
421 - Other expenses	30	
Total expenses		**36,500**
Excess of revenues over expenses LE		**7,600**

G. Bahr el Dahram BCWUA Statement of Assets and Liabilities

Table 12. Assets and Liabilities

Assets		
Cash (from expense account #418)	1,500	
Accounts receivable (Ministry reimbursements forthcoming)	0	
Inventory (materials, supplies)	100	
Savings account (from expense account #418)	1,000	
Prepaid expenses	0	
Reserve account (Remaining balance of expense account #418)	2,675	
Total current assets		**5,275**
Land and buildings	250,000	
Equipment	4,000	
Other fixed assets	1,000	
(Less depreciation)	(100,000)	
Total fixed assets		**155,000**
Long-term investments	0	
Enter other assets here	0	
Enter other assets here	0	
Total other assets		**0**
Total assets		**160,275**
Liabilities and Equity		
Current Liabilities		
Accounts payable	400	
Short-term loans payable	0	
Other current liabilities	0	
Total current liabilities		**400**
Long-term Liabilities		
Long-term loans payable	0	
Other long-term liabilities	0	
Total long-term liabilities		**0**
Equity		
Net equity	0	
Retained earnings	159,875	
Total equity **LE**		**159,875**

7. Conclusions and Recommendations

Increased user participation in planning, operation, maintenance and management of branch canal irrigation unit is a desirable goal and are supported by the results achieved during this benchmark implementation period. The formation and establishment of water user associations at the branch canal level has proven to be a viable, highly desirable means of intensifying farmer participation in irrigation management. Management capabilities and capacities at this level must be supported and improved as water supplies become more constrained and the innovation of continuous flow availability is advanced to larger areas of the system. Willingness on the part of users to assume part of the O&M costs, in the form of time, labor, and finances, is shown to reduce government costs in operations and maintenance, and will affirm that eventual management transfer can be successfully negotiated in the future.

The development of semi-autonomous and quasi-private irrigation districts may be a long-term goal. In such cases, the district water user organizations are entirely responsible for the operation, maintenance and periodic upgrading of water delivery and control structures within their districts. This *irrigation management transfer* process is recommended to be the subject of a performance benchmark during the next EPIQ implementation cycle of water policy development.

7.1 Recommendations for Tranche IV Benchmarks

Achievements to date in BCWUA formation signal two important water policy directions for the future. The first will be formally amending Law 12 on Irrigation and Drainage to allow formation of WUAs at all levels of the Egyptian irrigation system. The second involves launching an innovative pilot program of irrigation system management transfer to the private sector.

7.1.1 Amending Law 12

As part of its on-going review of Law 12, MPWWR will take steps to amend the law to allow formation and registration of Water Users Associations in all categories of land and among primary, secondary and tertiary levels of the irrigation system. Until such time as the law is amended, these organizations will function legally under the mandate of a MPWWR ministerial decree. With Law 12 appropriately amended, MPWWR will have the capability to 1) implement a national plan for BCWUAs in the Old Lands, and assign Government resources to support it; 2) reduce implementation costs for mesqa-level WUA development in the Irrigation Improvement Sector by employing the BCWUA as an organizing mechanism; and 3) further private sector opportunities in water and agriculture extension services.

7.1.2 Pilot Program for Introducing Irrigation Management Transfer (IMT)

Irrigation Management Transfer (IMT) allows the private sector to assume managerial control over the physical infrastructure, its operations and many O&M tasks, thereby reducing government expenditures. IMT is a logical progression in the participatory process from developing branch canal-level water user associations. The incentives for Government and farmers to undertake this initiative include an overall reduction in the cost of irrigation, enhanced financial self-reliance of irrigation schemes, expansion of service areas, greater irrigation water efficiency, and increases in cropping intensity and yields. It is apparent that the GOE cannot continue to provide the present quality and range of infrastructure services, including system O&M in new areas, and still provide high-quality services in the old lands in the Nile Delta and Valley. The organizations that take on this role will be financially autonomous, within parameters establishing by the GOE enabling statutes or decrees, and will be able to hire or contract for technical operational and management services.

This recommendation for Tranche IV represents a major policy and conceptual shift toward empowering users and other private sector entities, increasing public appreciation for management by the end users gained from the BCWUA benchmark. Irrigation schemes will become self-regulating and potential for on-farm water conflicts will decrease. The process of irrigation system subsection transfer is an evolutionary one, and a national plan for management transfer would be phased over a period of many years.

7.2 Other Recommendations

The following recommendations are based on the activities implemented under this benchmark:

- MPWWR should strengthen irrigation extension delivery by providing adequate budgetary, infrastructure, training and personnel resources to the Irrigation Advisory Service.
- MPWWR should continue to support and strengthen the role of the ministerial Action Team on Participatory Irrigation Management.
- In order to respond more efficiently to local needs, mesqa-level and branch canal WUAs should include both irrigation and drainage functions. The creation of drainage collector associations should be discontinued.
- IAS should adopt a flexible approach and procedure for organizing BCWUAs, employing an integrated team strategy involving IAS, Irrigation Department, Drainage Authority, IIP where present, and Agriculture Extension, depending on local prevailing conditions. The BCWUA organizing strategy should ensure equal representation.
- MPWWR should establish, with BCWUA cooperation, maintenance centers for spare parts, equipment, and other O&M material used in irrigation improvement at the branch canal level.

- BCWUAs, irrigation district engineers, IAS engineers and IIP engineers will jointly plan, design and implement branch and distributary canal improvements in the command area and establish continuous flow and downstream water level control.
- In unimproved command areas, IAS should establish BCWUAs at least one to three-years in advance of any irrigation improvement program intervention.
- In national irrigation projects, e.g. Toushka and El Salaam, while land is being distributed, 1) membership in a canal association should be included as part of the contract agreement, and 2) the contract agreement should include a statement of rights and responsibilities regarding water management and canal maintenance.
- The branch canal O&M cost-sharing plan process should continue to be refined and adopted as a standard feature of the BCWUA organizing process. The mechanisms for implementing the plan should be defined including a method for MPWWR to directly contract with the BCWUA for O&M tasks.
- The Irrigation Advisory Service (IAS) should strengthen central as well as local coordination with public and private sector agencies, e.g. Agricultural Extension, agricultural census unit, cooperatives, banks, growers' associations, local councils, research institutes, et. al.
- Coordination should be maintained with all other projects working in this sector, e.g. the Netherlands government-assisted project on water boards.
- Awareness building programs for BCWUAs and MPWWR engineers, technicians and field agents, need to focus on priority concerns.
- The potential for WUAs in New Lands, national project areas and oases needs to be carefully assessed and analyzed for future planning.

8. List of Cited References

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MPWWR. Proceedings of the Second National Workshop on Participatory Irrigation Management, Alexandria, November 1998.

Appendix A

1. MPWWR Ministerial Decree Sanctioning:

    a) The Establishment and Official Registration of Branch Canal Water User Associations on Four Selected Sites
    b) Ministerial Action Team on Participatory Irrigation Management

2. Under Secretarial Ministerial Decrees Formally Establishing Branch Canal WUAs at:

    a) Qemri,
    b) Bahr el Dahram and
    c) Balaqtar

Appendix B

Cost Sharing Planning Process for Branch Canal O&M

1. Introduction to the Cost-Sharing Framework Process

Farmers should gradually participate more fully in the operation and maintenance (O&M) of their branch canal; that portion of the irrigation system between mesqas and the main feeder canal serving irrigated areas. This participation is essential to improving overall irrigation system management in Egypt.[8] It may be accomplished through branch canal water users associations (BCWUAs). The cost-sharing framework presented here is designed to help develop these associations.

In anticipation of possible changes in GOE operation and maintenance disbursements in coming years, farmers need assistance in preparing for future economic conditions. This can be accomplished gradually to allow farmers sufficient time to adjust. Any cost-sharing framework should help this adjustment. It should help water users associations assume greater local management responsibilities and real-time water reporting capability.

It is recommended that these associations be awarded annual O&M contracts, instead of the Ministry relying mainly on private contractors. There also may be some direct funding of O&M work by the associations themselves, for certain tasks, through a small annual O&M assessment, depending upon local capabilities. Finally, there will be an increased role for these associations in overseeing branch canal water supplies, even when canal operations are improved through modern engineering.

The following report presents a cost-sharing framework, its justification in terms of irrigation system management in Egypt, and some of the opportunities and constraints to the framework. Examples, using various worksheets, of applying the cost-sharing framework to two BCWUAs is provided as well.

1.1 Need for the Cost-Sharing Framework

Again, the participation of branch canal associations in their own canal O&M costs is envisioned because of an expected gradual reduction in GOE resources allocated to canal systems.[9] Even if this were not the case, there is a need to improve supervision of water flows at the local level to minimize problems with rising water tables, undesirable drainage and inequity.

At the same time, it is believed that higher levels of irrigation system management might be assisted through the presence of these associations. This occurs when these entities gradually develop water record keeping capabilities of their own. Such capability could

[8] R. Bakoum and E. Barakat, I*rrigation Improvement Project in Egypt: Private Water Associations, Farmers Participation and Cost Recovery Issues,* Workshop on Farmer's Participation Advisory Panel Project, April 10, 1999.

[9] APRP, Egypt's *Irrigation Improvement Program*, Report #7, June 1998.

provide real-time aggregate reporting of local branch canal water demand to the Ministry. This would aid the Ministry's ability to track and forecast water demand, along with information obtained from other government sources on changing cropping patterns. One might imagine the benefits to national water resource planning if this bottom-up data assembling and reporting capability were to be developed by BCWUAs.[10] This is believed entirely possible in terms of the type of associations envisioned in this report.

These BCWUAs are governed by a locally elected council, have bylaws, and will be a legal entity. They also will have perhaps a small office and staff, including a few canal patrollers trained to measure water and maintain daily records. These associations would levy a small annual O&M assessment to cover their costs, perhaps supplemented by government financial assistance through O&M contracts as discussed here. They might serve several neighboring branch canals to maximize economy of scale.

1.2 Addressing Opportunity Costs

Clearly, there are many social benefits from this form of participation that cannot be easily measured in economic terms. However, it is important to acknowledge that participation imposes costs on farmers in the form of time and other resources. Participation can be said to have a known opportunity cost.[11]

Attempts are made through the cost-sharing framework to minimize these opportunity costs. The associations are reimbursed for their participation in branch canal O&M contracts. In the meantime, they are permitted to build up a small capital reserve in the course of doing so. This continues over several years until such time that associations have sufficient economic resources and incentives to assume more managerial, fiscal and record keeping responsibilities on their own.

In addition to participating in O&M contracts, it is believed that opportunity costs incurred in building these associations can be greatly minimized through other means. Again, this is accomplished by making use of economy of scale in their management of branch canals (Section 3.1). Additionally, it is believed that these associations can reduce local farm irrigation labor costs incrementally through a variety of other mechanisms (Section 3.2 and 3.3). Finally, these associations can reduce opportunity costs to farmers through the elimination of appreciation payments if they are occurring (Section 3.4).

Water users associations minimize opportunity costs when they are organized as small managerial, fiscal and record keeping entities. They conduct these tasks through a small staff that relieves farmers of the high opportunity costs associated with direct

[10] It is what irrigation districts and canal companies do in the United States, and it is what even small *acequias* do in Spain. In fact, it is entirely likely that development of these record keeping and reporting skills would have lower opportunity costs to farmers than assuming various aspects of canal maintenance, some tasks of which are quite expensive (i.e. mechanical dredging of canals).

[11] It has been shown through studies that there is generally no low opportunity-cost labor in agriculture? s off season as well. Opportunity costs for participating in branch canal O&M would occur, regardless of whether this participation occurs in the off season or during the agricultural season.

participation. Examples of direct participation include mass mobilization of labor seasonally, mass unstructured meetings and the like.

Through their association, farmers participate indirectly and at a much more modest cost, usually represented by voting on an annual association O&M fee and possible modifications in bylaws to meet new needs. Bylaws are needed to govern the association. The annual fee purchases goods and services at economies of scale (one or two full time employees, light equipment, materials and supplies), and at a cost far lower than the opportunity costs of voluntary labor mobilization. Reduced opportunity costs to farmers is discussed in Section 3.[12] [13]

1.3 Overview of Proposed Cost-sharing Framework

The cost-sharing framework proposes to utilize: (1) O&M contracts being awarded to branch canal associations, (2) earnings from this contract work to be used by associations to develop managerial, fiscal and record keeping skills, (3) a three-year developmental plan utilizing, (4) a five-year base value for determining a ceiling on O&M contract revenue for these associations, (5) a negotiated process between GOE and the associations that defines a unique cost-sharing pathway for each association, based on the size and scope of the O&M contracts, and, (6) a memorandum of understanding between GOE and the associations that is contractual in nature, and covering the details of each association" s unique cost-sharing pathway. This MOU is similar to a legal contract. It spells out procedures for financial transfers, responsibilities and transparency.

1.4 General Criteria for Cost-sharing

A cost-sharing framework associated with branch canal O&M should meet the following criteria. First, it should minimize opportunity costs to farmers for participating in O&M. Again, this can be accomplished primarily through the use of (1) practical economic incentives, and (2) the development of the water users association and what it brings to water management.

Second, the cost-sharing framework should have a phasing in process; one that provides farmers sufficient time to gradually adjust to new responsibilities.

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[12] Voluntary participation in branch canal operation and maintenance requires time on the part of farmers that would otherwise be allocated to something else, and therefore would have a known opportunity cost. The cost-sharing program proposed here makes no distinction between financial contributions and contributions in labor. They are one in the same, since labor time can be given a financial value as well.

[13] Some observers may argue that, since farmers are making income from irrigation infrastructure developed by the government, they should be willing to pay for at least some of its operational and maintenance requirements. However, one must be cautious with this argument. Farmers are generally price takers, not price makers, when it comes to interacting with the marketplace; and for both farm sales and production costs. This is commonly reflected in their gross and net farm income, a portion of which would be used to pay for branch canal O&M in the future. Furthermore, farmers can be said to operate economically in one of the purest forms of competition there is. These facts condition the degree to which cost-sharing can occur.

Third, it should facilitate the development of branch canal water users associations with specific leadership, managerial, fiscal and record keeping skills.

Fourth, the framework should be applicable to both improved and unimproved irrigation systems in Egypt.

Fifth, it should be applicable to both the presence and absence of a mesqa improvement package.
Sixth, it should have flexibility in meeting many different irrigation conditions in Egypt.

Seventh, it should have the capability of being implemented with a minimal amount of new administrative procedures or requirements for GOE.

Eighth, it should be performance-driven, in that farmers are required through the program to meet certain specific goals or targets over time in the formation of their branch canal water users association.

Finally, the cost-sharing framework should have sufficient flexibility to provide farmers with different "pathways to cost-sharing in branch canal O&M. It should accommodate different levels of income and operational costs associated with branch canal O&M.

1.5 Key Lessons Learned From Other Cost-sharing Programs

It has become apparent through the implementation of other types of cost-sharing programs, such as for soil and water conservation, that the cost-sharing program itself should be a means to an end, rather an end in itself. There is a separation between the objectives of the cost-sharing framework and its method of implementation.[14] For instance, if the cost-sharing framework provides farmers economic resources, as in the one presented here, it should contribute clearly to the accomplishment of specific institutional targets or goals.

With soil and water conservation cost-sharing programs, the target is not only restoration of soil and land resources, but visible adoption of new management practices. Thus, the objective is not farmer participation in O&M contracts per se. The method of having farmers participate in O&M contracts is a means to an end.

It is known that generally only high return/low investment cost-sharing strategies are readily accepted by farmers.[15] If it can be demonstrated that the development of water users associations for branch canals represents a high return/low investment goal, which

[14] T. Napier, S.M. Camboni, and Samir A. El-Swaify, *? A Synthesis of Adopting Conservation on the Farm: An International Perspective on the Socioeconomics of Soil and Water Conservation*, in Adopting Conservation on the Farm, Soil and Water Conservation Society (1994).
[15] R. N. Sampson, *Farmland or Wasteland: A Time to Choose*, Rodale Press, Penn. (1981).

we believe it can, it will have great attraction. If the corresponding cost-sharing framework has low opportunity costs, it will have great attraction.[16]

Success in the use of economic incentives has a long history.[17] Without these economic incentives, it is doubtful if the program will succeed. Furthermore, farmers prefer voluntary approaches to cost-sharing.[18] The high economic return for WUA development at the level of the branch canal must be clearly seen by farmers. Information in training programs must show improvements in income that can be generated by way of more convenience and less crop production labor time foregone in accessing water through these associations.

For a cost-sharing framework to be successful, some performance obligations for both the farmers and the government should be present. For the government, this usually means transparency in its sharing of necessary information with the association. There is considerable need of information sharing in the framework discussed here. For the association, it usually means openness in the decision of association council members. Only then is some previously agreed upon form of reimbursement by the government, compensation, subsidy or grant awarded. Compensating farmers for work performed and institutional development targets obtained, and following inspection and evaluation of O&M work undertaken by the association, as would be the case with any private contractor, would seem necessary.

If friends or relatives of water users association councilmen benefit more than other farmers, or if the prioritization of O&M work consistently favors certain reaches of the branch canal over others, or if association funds are borrowed or otherwise improperly used by councilmen, rent-seeking is said to have occurred. This must be minimized in order that trust of all farmers in the program is not compromised. Loss of trust can lead to setbacks in the overall BCWUA development program.[19] [20]

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[16] There is considerable evidence from the short life of the IIP project that mesqa water users association development leads to improvements in farm income, aside from the mesqa improvement package that has generally accompanied this project activity. This will be expected form branch canal water users associations as well, although perhaps not at the same rate per *feddan*. APRP, *Egypt's Irrigation Improvement Program, Report No. 7"* (June 1998). MPWWR, USIAD, APRP, EPIQ.

[17] Infra note 7. See also, P.J. Nowak, *The Leadership Crisis in Conservation Districts*, Journal of Soil and Water Conservation (March-April, 1992); P. Nowak, *The Role and Capacity of Conservation Districts in Resource Management*, Journal of Soil and Water Conservation (March-April, 1992); M.M. Garner, *Regulatory Programs for Nonpoint Pollution Control: The Role of Conservation Districts*, Journal of Soil and Water Conservation (September-October 1977): J.S. Rikoon, J. Gilles and E. Perry, *The Changing Context of Conservation District Activity: A View from Missouri* (Journal of Soil and Water Conservation (January-February, 1992).

[18] Infra note 7, F. Swader, *Soil and Water Conservation: An International Perspective.*

[19] M. Moore, personal communication.

[20] In the United States, county Agricultural Stabilization and Conservation Service (ASCS) farmer committees are responsible for prioritizing cost-sharing plans and awards made to individual farmers for installing soil conservation and other resource conservation practices. Experience with ASCS committees in the United States has shown some rent-seeking problems, in the form of favoritism given to some farmers by the county committee at the expense of other farmers. This rent-seeking is sometimes found in the initial stages of an ASCS cost-sharing program, until such time as the procedures have been properly

2. The Important Role of the Branch Canal Association

There is great need to ensure that branch canals will be properly maintained.[21] They are an important link between the main system and privately managed mesqas. They represent a capital investment made by GOE to ensure food security in the future. If they depreciate in value at a rate that will require yet additional capital investment in the short span of a few years, this will impose renewed and undesirable costs on GOE. The delivery of irrigation water to farms can be threatened by future weakening of this important hydrologic link in the system.[22]

The policy of allowing these associations to perform O&M contracts is designed to improve the allocation of government funds and to obtain greater benefit from these expenditures. Although it should be empirically verified, it is believed that associations will do more careful work, thereby increasing the length of time before maintenance needs repeating. This would tend to reduce the overall rate of depreciation of the irrigation system below current rates. In turn, lower rates of depreciation can prolong the need for rehabilitation, and reduce future costs associated with this rehabilitation when it occurs.

It is believed that management of a branch canal by a water users association will result in better overall management, leading to improved availability of water for all reaches, in addition to reducing the canal's rate of physical depreciation. There is also the benefit of greater convenience and more equity in distribution throughout the branch canal service area.[23] Farmers obtain these benefits through a canal association operated essentially as a record-keeping house. [24]

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instituted and supervised. This is often the period when trust in the program is most compromised. Similar damage to the implementation of any cost-sharing program can be irreversible at times.

[21] R. Cardinalli, ? *USAID Water Resources Results Package: Water Users Associations in Non-IIP Areas and Development of Secondary-Level Branch Canal Water Users Associations*, Workshop on Farmer's Participation Advisory Panel Project, April 10, 199. The author reports on the results of a recent series of focus group workshops with farmers, and indicating overwhelming positive interest among stakeholders in establishing the equivalent of branch canal associations.

[22] Irrigation systems can be given a depreciation rate. It is important to do so, in order to set aside funds for future upgrading. A typical rate is 10% per annum, but may be more, depending upon irrigation circumstances.

[23] A branch canal service area might be viewed as a giant farm in itself. The better the water supply is distributed throughout this giant farm, the more farm income generated from it, and therefore the greater capacity there is for farmers in the branch canal to cover O&M costs. This is realized because the cost of operating and maintaining the branch canal is prorated or distributed across more *feddans* of productive land, requiring less income from each feddan to cover branch canal O&M costs.

[24] What is meant by a record keeping house is a water entity that operates with essential managerial, fiscal and record keeping skills for cost accounting, modest O&M fees to cover operational costs, and perhaps one or two full time employees. This record keeping house is a nonprofit entity in nature.

Currently, branch canals operate using the concept of equalizing basins that are stabilized through continuous flow and the use of downstream regulators.[25] There is no charge for water service at this level of the irrigation system.[26] However, the concept of an annual association O&M fee would gradually develop if a branch canal water users association were formed. This is needed because there is always some operational requirements for maintaining reaches of the canal at optimal performance, even if sophisticated telemetry is used. There are gates and equipment to protect from children and others. Although the demand and performance of mesqa pumps on branch canal reaches is theoretically enabled by downstream regulators, daily monitoring of mesqa withdrawals would add to improved management of these canal reaches. This would seem to require some daily record keeping on fluctuations in mesqa demand, as well as indicative readings for each canal reach.[27] Finally, as suggested earlier, useful weekly or monthly aggregated data on water demand could be passed from the branch canal association to the Ministry to improve forecasting and planning.

In the absence of sufficient irrigation department employees to provide this oversight and service presently, economic benefit can be realized to farmers through association record keeping of mesqa demand in these canal reaches. The association would ensure optimal use of the canal reaches at all times, whether these reaches are located at the head or tail of the branch canal.[28] To do this, some basic record keeping skills and a few employees are needed by the association. Again, several branches might share one record keeping office. This organizational design would be phased in slowly. Additional responsibilities for reporting real-time data to the Ministry, via local irrigation departments, would also be phased in. Gradually over time, the association would assume more responsibility for conducting most of the routine maintenance in the branch canal as well.

Also, the association would become more significantly involved in assisting GOE in the formation of mesqa WUAs. This greater involvement of branch canal associations in mesqa WUA formation is needed to minimize the cost to GOE of being involved in these expensive organizing activities. Greater involvement of the branch canal association could free up some GOE funds. This could create another definable economic incentive and/or reduction of opportunity costs for farmers in developing the branch canal association, should such savings become available to meet previously deferred maintenance in the branch canal.

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[25] APRP, *Water User Association Formation Outside the Irrigation Improvement Program Area*, Report #9, June, 1998.

[26] There is a charge, or more appropriately cost, for water at the mesqa level. It is self-imposed through pumping costs.

[27] A typical example is the Qemri branch canal now being considered for piloting the proposed cost-sharing plan. The Qemri service area is about 7000 *feddans*. It has eighty-four mesqas. In the United States this would be considered a large water users association because of the number of service points or headgates-- relative to the size of the service area. An association of this size would almost invariably require a minimum of one, but quite likely two, full time ditch riders.

[28] Fieldwork conducted during the consultant's tour indicates that the concept of ditch riders or patrollers to effectively supervise branch canal operations, and to maintain equalizing basins to meet variation in mesqa demand, is constrained by insufficient irrigation department funds.

There is also the possibility of BCWUAs becoming more involved in the management and maintenance of drainage systems in their area.[29] This additional task makes important sense and appears very suitable to these associations. Generally, all farmers contribute incrementally to local drainage problems through irrigation, although perhaps a smaller number of farmers are ultimately affected by drainage problems.[30] Association participation in drainage maintenance is recognized by some water management specialists who see the important relationship between ranch canal management and local drainage problems. This added drainage role of BCWUAs appears to be supported by policy makers as well.[31]

Mesqa associations would continue to manage mesqas much in the way they are doing throughout the country today. Mesqas appear to be essentially private collective enterprises, nominally if not in reality.[32]

Through the proposed cost-sharing framework, the local branch canal would gradually begin to operate similarly, but as a somewhat larger managerial, fiscal and record keeping entity.[33] The proposed framework would help achieve this, particularly in the old lands where economic incentives for farmers to assume more responsibility for branch canal management are frequently difficult to design, and where the opportunity costs to organize may be significantly higher than in newer lands.

This particular WUA design represents a federation of MWUAs under a parent branch canal association.[34] This overall association design has been discussed for the next phase

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[29] One observer has reported results of a study that conclude that making use of existing WUAs in drainage management is probably preferable to creating an additional collector users association. This was discussed in association with the operation and management of closed drainage systems in IIP areas, MPWWR, NWRC, Drainage Research Institute, *Progress of Activities for Controlled Drainage and Farmer Participation*, Workshop on Farmer's Participation Advisory Panel Project, April 10, 1999.

[30] Drainage can be a classic free-rider problem if not handled through a farmer association that spreads the cost of drainage management across all effective contributors to the problem. Farmers who are not affected by drainage problems, but who nevertheless contribute to the problem, will generally continue to treat drainage as a non-issue unless they are assessed for its management. In the United States, drainage maintenance is usually covered by an additional small assessment per wetted acre for irrigators in an irrigation district or a specially organized drainage district. This assessment covers the operation and maintenance cost of the drainage system. Drainage has another aspect to it in Egypt, as well as the United States. This is associated with its economic value in being able to be reused. Drainage rights, or return flow rights, are true water rights in the United States and Spain. The National Water Resources Association (NWRA), the pre-eminent water association in the United States, advocates and promotes the economic value of water reuse. It is unclear what the situation is, or will be, in Egypt.

[31] S.A. Saad, *Collector Users Associations: An Evaluation Made by EPADP*, Workshop on Farmer's Participation Advisory Panel Project, April 10, 1999.

[32] Cost is shared across all farmers served by the mesqa more or less equally. A standard pump rate per hour is generally used. Farmers are thus contributing to the operation of the mesqa pump and the maintenance of the mesqa in proportion to their use. This is a sound system, and gives true economic value to the use of irrigation facilities as well as economic value to the water pumped and used.

[33] The term irrigation enterprise has already been found in the present literature on water users associations in Egypt, infra note 1.

[34] The concept of a parent association, with smaller affiliates under it, is an old concept in the United States and Spain. It has worked very well over the years. It is felt to be a good design for Egypt. In this design,

of WUA development in the old lands.[35] It would be initiated through, and facilitated by, the cost-sharing framework proposed here.

the mesqas are private and autonomous affiliates of the parent branch canal association, the latter of which operates much more like a canal company or a small irrigation district.

[35] Infra note 9.

3. Review of Opportunity Costs and Their Savings

It is useful to examine some of the ways in which branch canal associations can minimize, or even negate, opportunity costs. It is understood that sharing of the cost of branch canal O&M by GOE and farmers will have some impact on farm income. It is not entirely known how serious this impact will be. There is some variation in branch canal operating cost, as well as some variation in farm income from one area to another.

Based on only two examples, the cost of operating a branch canal can range anywhere from seven to ten Egyptian pounds per *feddan*, if undertaken by a branch canal association entirely on its own.[36] Needless to say, it will be difficult to cover all of this cost through a water users association. The government continues to share in some O&M costs. However, we must keep in mind that there appear to be important social benefits to increased association responsibilities, for which economic value often cannot be easily determined. Examples would be benefits of (1) local control of water resources and (2) improved dispute resolution.[37]

What minimization in opportunity costs can be identified for participating in these associations? How will BCWUAs reduce the need for government funds in the future? Some of the following benefits, when taken individually, are not major. However, it is their combined economic value that is believed to reduce opportunity costs for participating in branch canal associations.

3.1 Utilizing an Economy of Scale.

An example of reduced opportunity costs associated with the presence of a BCWUA is when water problems arise that require special attention beyond the abilities of any individual farmer, or requiring the need of an impartial mediator. Presently, it is known that many farmers are forced to make a one-half hour trip from the Qemri branch canal service area to the main Irrigation Department office in Zagazig. These trips occur for many of the same reasons already indicated. Such a trip will have transportation costs for the farmer, as well as the possible foregone value of farm labor lost through having to make the trip.[38] These are real opportunity costs that are reduced through the formation of an association with managerial, fiscal, record keeping and dispute resolution skills.

3.2 Reduction in Farm Irrigation Labor Costs.

The aforementioned goods and services provided by the BCWUA tend to reduce many common day-to-day inconveniences associated with mesqa pumping, many of which

[36] Information on branch canal operating costs were obtained from the Irrigation Department for the Qemri and Bahr el Darham branch canals during a data collection field trip in May, 1999 (not published).

[37] A. Maass and R.L. Anderson, ...*and the Desert Shall Rejoice: Conflict, Growth and Justice in Arid Environments*, Robert E. Krieger Publishing Company, Inc. (1986).

[38] It may be questioned whether or not there is reduced opportunity costs in farm labor foregone with such trips. It would of course depend upon the time of year. However, it is likely that water problems will occur at critical growing periods, thus suggesting that farm labor foregone will be an issue to the farmer. It is an empirical issue that could be rather simply analyzed for its economic cost.

contribute in numerous incremental ways to increased farm labor costs.[39] Any reduction in the cost of labor associated with irrigation that is minimized by a small staff of patrollers on the branch canal, would seem to offset any added farm budget cost associated with developing and maintaining an association through a small annual O&M assessment, whether a farmer is located at the head or tail of the branch canal.

Furthermore, the frequent inability of the Ministry to have reliable real-time data on local water demand is believed to be a major cost item for farmers in lost time and possibly lost yield. It is the *cumulative* cost of lost time and yield at the local level that is significant, however good overall yields in the region might be. Any opportunity costs associated with the development of the BCWUA as a record keeping entity would seem to be offset by the opportunity costs of inefficient allocation of farm labor and lost yield due to many minor inconveniences in accessing water. This is particularly so when insufficient water supplies for the branch canal occur at critical periods of crop growth.

3.3 Lower Opportunity Costs With Improved Income Distribution.

It is believed that management of a branch canal by a water users association will result in improved availability of water internally for all reaches of the canal. The greater distribution of even modest improvements in gross farm income throughout the branch canal service area, allows the cost of operating and maintaining the branch canal to be prorated or distributed across more *feddans* of productive land. This potentially requires less income from each *feddan* (lower opportunity costs for each farmer) to cover branch canal O&M costs.

3.4 Reduction in Appreciation Fee Costs.

It is common that when there is a pool of public resources to be allocated under equitable terms or formulas, there may be attempts by certain people to ignore these terms or formulas, thereby benefiting disproportionately in the distribution of these public resources. Likewise, when essential public goods or services such as water are provided, it may be possible for certain individuals to exact unauthorized benefits in the allocation of these goods and services. In economic theory, this activity falls under the general category of rent-seeking. It is particularly difficult to control administratively when local oversight cannot be provided.

Modest and often incidental appreciation payments to public good providers can occur through (1) rather arbitrary prioritization by a public good provider in the administration of these goods and services to recipients, (2) exacting additional income from public good recipients, above and beyond the recipient's required cost.

[39] These may include wasted time looking for alternative sources of water when the head of the mesqa pump is insufficient for optimal use, removing trash from the mesqa trash screen, damage to pump motors as a result of low pumping volumes, etc.

These small appreciation fee activities can contribute incrementally to costs borne by farmers for irrigation. The cost of a small O&M fee paid annually to the association, to cover the wages of a patroller under the supervision of a local entity rather than a distant entity, such as a public agency, would be offset by eliminating the need of common forms of rent-seeking payments under conditions of non-local control. Placing O&M activities under local control can be shown to have real economic advantages to farmers.

Again, each of the above-mentioned economic benefits, when taken individually, may not result in much reduction in opportunity costs associated with participation in a BCWUA. However, when summed for their net affect, the reduction in opportunity costs may be considerable. Even if it is only the opportunity costs associated with participation that are met, rather than any real improvements in farm income, the many ancillary social benefits that can accrue as a result of these activities--and that cannot be easily measured in economic terms--will likely develop in the community.

However, this will not happen if the BCWUA is not transparent in its management. It must:

- develop managerial, fiscal and record keeping procedures that are open and detailed enough to ensure the four above-mentioned benefits
- be representative in its leadership
- control attempts by council members to engage in their own rent-seeking behavior; meaning that the council must be fair and reasonable in its decisions and administration of resources
- have bylaws and rules and regulations governing its activities
- have legal standing in the country

Without these minimal safeguards, it is unlikely that the above-mentioned reduction in opportunity costs can be realized. Negative social consequences can also develop in the absence of the above requirements, wiping out all of the social benefits associated with more local control. However, the proposed cost-sharing framework provides important safeguards and mechanisms for ensuring that many of these negative practices do not develop and threaten the organizing efforts. In addition, it would be expected that the Irrigation Management Service (IAS) would play a central role in helping branch canal associations achieve these targets, along with assisting in the implementation of the cost-sharing framework.

4. Basic Elements of the Proposed Bcwua Cost Sharing Framework

In recent focus group sessions conducted with the Qemri and Bahr el Darham BCWUA councils, these councils indicated a willingness to participate in certain O&M tasks.[40] Most O&M tasks, particularly the more expensive ones, such as mechanical dredging and the maintenance of bridges, would be avoided by the association until such time that it felt financially capable of taking them on. In the meantime, these associations have indicated a willingness to enter into O&M contracts for weed control, utilizing association council time to mediate in canal transgressions, and perhaps hiring a canal patroller and paying for his services, along with other needs, through a small annual assessment. The willingness to engage in such activities shows the vision that many farmers have of these associations, as well as the immediate potential available in utilizing the cost-sharing framework.

There are eight basic elements to the cost-sharing framework. Again, the proposed program will greatly minimize up front opportunity costs, giving farmers time to adjust to the new regime and to assess its benefits. Re-direction of GOE funds from private contractors to BCWUAs for branch canal O&M work will be the basic economic incentive, as well as any governmental policy changes needed to implement the concept. It is believed that this can be accomplished with minimal administrative adjustments. The following elements describe the cost-sharing framework.

4.1 The farmers will do some of the annual O&M contract work themselves. The BCWUA is the contracting entity for the farmers served by the branch canal. Such work will be directed and overseen by the association. Farmers do not enter into contracts individually. At most, some local farmers are employed by the association to perform this contract work.

4.2 Farmers, through their association, will conduct O&M at a scale suitable to their economic abilities, and will be reimbursed upon completion of the work by the Ministry at a fair market rate.

4.3 The cost-sharing framework uses a computed five-year base value for determining this fair market rate for O&M contract work. This five-year base value is negotiated between GOE and the farmers. It uses previous records of O&M costs incurred from private contractors, or other appropriate records. The five-year base value represents the estimated annual cost of all the principal expense items associated with annual canal O&M.

4.4 The cost-sharing framework uses a phased three-year developmental plan for BCWUAs that can be redesigned and renewed at the end of a three-year period. This developmental plan has some institutional performance targets associated with it. There

[40] Appendix D reports on two focus group session conducted as part of the preliminary development of cost-sharing plans in two pilot branch canals.

are some modest penalties associated with not meeting targets in the developmental plan.[41]

This particular element of the program is very important for the following reason. Each phase toward increased cost-sharing of the branch canal moves the local farming community toward greater responsibility in its overall management. This includes the development of managerial, fiscal, record keeping and dispute resolution skills. How this is accomplished is discussed in Section 5.4.

4.5 The cost-sharing framework provides many different pathways to BCWUA development over the three-year plan. Each three-year plan represents different levels of participation in various categories of O&M work. Each branch canal negotiates its own cost-sharing pathway, using its own knowledge of local farm income and branch canal problems. It produces its own menu of cost-sharing with the government.

4.6 The negotiated cost-sharing pathway is finalized in a memorandum of understanding between farmers and GOE.[42]

4.7 Training and workshops for the farmers are needed to implement the cost-sharing plan. These can be implemented through the IAS outreach team.

4.8 The renewable three-year plan also phases in a mesqa improvement package at the same time, assuming there is a mesqa improvement package available to farmers through GOE. The program does not entirely depend upon the availability of an improvement package, but a mesqa improvement package will most likely move the farming community more quickly in the direction of BCWUA development if carefully linked to developmental targets. When available, mesqa improvement is an important additional economic incentive to the overall cost-sharing framework.

More than one three-year plan might be needed and therefore negotiated by farmers. However, it is anticipated that some branch canals will see the development of extensive BCWUA management by the conclusion of the first three-year plan. They will reach some of the more important managerial, fiscal and record keeping targets. This depends on several factors that will be tracked and easily measured as a matter of routine process documentation in the proposed cost-sharing framework.

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[41] The concept of penalties for cost-sharing programs is fairly new, although now generally recognized as an important design feature for these programs. In cost-sharing programs in the United States for instance, the concept of cross-compliance has been introduced as a way of penalizing farmers who fail to meet the targets of their cost-sharing contract, or who breach the contract for any reason.

[42] This memorandum of understanding is really between the water users association and GOE. Much as in a PL 566 Watershed Program in the United States, the contracting water association or quasi-governmental entity is bound by certain conditions spelled out in this memorandum of understanding. It is similar to a contract, but would more generally act to deny further assistance to the water users association in the future if it violated the terms of the MOU.

5. Detailed Description of Eight Basic Elements

Following is a more detailed description of each of the eight elements of the cost-sharing framework presented in Section 4.

5.1 The specific details of awarding the contracts will be developed by the implementing agency. This award will specify (1) contract procedures, 2) inspection, and 3) administrative requirements.

5.2 The reimbursement will be a payment in the amount covering the cost of work performed by the association. This payment would be made upon completion of the contract work as soon as possible. Delays in payment by GOE beyond the negotiated repayment date would result in charges to cover BCWUA foregone returns. A suitable standard interest rate would be determined and stated in the MOU.

The payment would be deposited directly into the BCWUA bank account. Withdrawals from this account would require association council approval, and be countersigned by appropriate officers of the council overseeing fiscal record keeping. It is not expected that the association will ask for voluntary labor in the completion of O&M contracts. It is anticipated that the BCWUA will pay farmers for goods or services rendered in fulfillment of O&M contracts. Therefore, withdrawals for such payments will be required.

However, it is expected that the BCWUA will hold back a portion of the payment received annually from GOE as a contingency fund. This capital reserve will be built up over time, and for the purpose of engaging in additional works or activities benefiting all farmers in the branch canal service area. These would include the hiring of a few salaried employees for routine canal patrolling, record keeping, etc.

The association financial account would be audited annually by an appropriate governmental entity or certified accountant. An annual report of expenditures would be developed by the BCWUA council and disseminated to all water users served by the branch canal, or posted in a conspicuous location for inspection by water users. An annual meeting of all water users would be convened by the association council to report on upcoming O&M contracts, the rate of reimbursement for goods and services provided by farmers, and the anticipated earnings to be allocated to capital reserve (the contingency fund). Proposed expenditures from the capital reserve would also be voted on at the annual meeting.

5.3 In order to determine the market rate for reimbursements of O&M contracts undertaken by the association, a five-year base value would be developed that represents the average cost of operating the branch canal, and for several different expense categories (see Appendix A). Information used to develop the five-year base value would be obtained from the Irrigation Department and farmers. The five-year base value is

computed for each and every O&M expense account category. Worksheet B shows an example of a negotiated five-year base value for one canal.

The development of the five-year base value is very important to the cost-sharing framework. In the past, the private sector contractors have bid on contracts. In doing so, they have anticipated a profit margin for themselves, and by doing so have helped set a market value for such work. The BCWUA is expected to do the work at essentially the same rate as the private contractors, but with the contractor's profit margin now going into the association"s contingency fund or capital reserve account. The association operates as a nonprofit entity. Information on past costs of performing O&M will be needed, in order to ensure that the BCWUA does not take on such contracts with incorrect market information, leading to exploitation of its negotiating position. Transparency will be needed in the development of the five-year base value.

5.4 The negotiation of O&M contracts will be for a three-year period. This is to minimize administrative requirements associated with repeated annual negotiation. In addition, not all O&M cost categories may need to be performed each year. The BCWUA will use the three-year plan to develop its capital reserve, in addition to meeting the O&M requirements. The three-year plan will also require the BCWUA to meet certain performance targets. Failure to meet these targets may influence future negotiations over O&M contracts. These targets include (see also more detailed discussion of each one in Appendix B):

5.4.1 Developing bylaws and rules and regulations for the BCWUA. The bylaws would pertain to the selection, activities and responsibilities of the BCWUA council, including duties and authority of a BCWUA canal patroller and office person. This may vary from one branch canal to another. The rules and regulations would pertain to any responsibilities farmers may have in accessing water in the branch canal. Included in this activity would be the development in an operations plan for the branch canal, or modifications to an existing plan to address potential inconveniences mesqas have in accessing water from the branch canal.

5.4.2 Hire a minimum of one paid patroller as a permanent staff member of the BCWUA. This will include developing a specific job description for the patroller. Provide the patroller with a suitable form of transportation to patrol the branch canal. Arrange for the patroller to receive training in branch canal water management and dispute resolution.

5.4.3 Establish a small office for the BCWUA, with a minimum of one full-time office person to record assessment payments, receive complaints, and to assist the canal patroller as needed.

5.4.4 Initiate a nominal annual O&M assessment for the BCWUA per irrigated *feddan*. The rate of this assessment is decided upon by the BCWUA council. However, the council will have to set up appropriate record keeping activities to administer

the assessment. These include (1) developing an annual budget that allocates this assessment, (2) developing billing statements for the assessment, or specific procedures for its payment by farmers, (3) include a penalty for late or delinquent payment of assessments, (4) develop payment journals or original books of entry for recording payments of this assessment. The original books of entry will require the BCWUA to have a full census of all farmers irrigating in the branch canal service area. This census should include the name of the farmer, the address of the farmer, the mesqa location(s) of the farmer's land, whether the land(s) is/are owned or leased, the name of the lessee(s) if applicable, and the number of *feddans* irrigated on the farm(s). The latter is needed to determine the assessment for each farmer.

5.5 The negotiation of the three-year developmental plan for the branch canal water users association involves a determination of what categories of branch canal O&M are to be assumed by the association, and what percentages of each cost category. This defines the particular O&M pathway for each BCWUA.

Each O&M expense item has a different cost (Worksheet B). Some expense items require heavy machinery and thus are not initially appropriate for the association to take on. Other categories require minimal equipment or cash reserves. They can be performed by hand labor. The BCWUA will need to determine what O&M expense items it can perform initially, and in later years. Therefore, this will require an evaluation of the entire three-year activity, and therefore the particular pathway to be taken by the BCWUA in assuming more O&M responsibility. Worksheet C shows an example of a negotiated pathway for one branch canal association.

The negotiation process is designed to encourage the BCWUA to gradually assume more responsibility for each O&M category incrementally over the three-year plan. By the end of the three-year plan, the BCWUA will have achieved valuable experience in most O&M expense categories.

5.6 The memorandum of understanding (MOU) is a partially binding contract, in that it places some limitations on renegotiating a new three-year plan if the performance targets for the first three-year plan are not achieved. In addition, the MOU very carefully details the commitments that the association and GOE have made for O&M contracts over the three-year plan. It provides specific detail on all of the seven other basic elements of the cost-sharing framework.

A renewal of the five-year base value used to calculate the ceiling on payments for branch canal O&M for another three-year period, and very likely at a reduced level, would occur only upon proven and measurable advancement in the formation of the BCWUA during the initial three-year plan. Re-negotiation at a lower base value would be the major form of penalty.

There may be other parties to the MOU, providing training and other forms of assistance, either by the water ministry or the agricultural ministry, in support of the BCWUA. The

MOU may act as a stimulus to verbally commit other government agencies or local entities to the association development program. This can be an advantage even if these other agencies do not provide specific resources right away. Their inclusion in the MOU can secure interest of other agencies in the program, and identifying possible ways in which they can be of assistance in the future.

Although the contracts are used initially to develop the BCWUA and its managerial, fiscal and record keeping skills, these contracts are not expected to continue indefinitely. There would be a *statute of limitations* on the awarding of contracts, and failure of the association to show measurable improvements in its ability to manage the branch canal would constitute grounds for suspending the awarding of O&M contracts and payments in the future.

5.7 Training and workshops will be essential for the cost-sharing program. An initial workshop would be needed to orient BCWUA council members to some of the economic benefits associated with water users association development programs in the past. These would include discussions of the IIP, activities being undertaken in other areas of Egypt, benefits received through branch canal and mesqa improvements, and some of the minimization in opportunity costs associated with BCWUA development; if not outright improvements in farm income.

Another workshop would be needed to negotiate (1) the five-year base value and (2) the three-year plan. This would involve fairly detailed data on branch canal O&M costs, what portions of that cost might be provided through farmers, and (3) what institutional performance targets farmers would be willing to commit to during the overall three-year plan.

Additional workshops will be needed on optimal branch canal operation, methods of maintenance that are sound for the branch canal, BCWUA fiscal and water record keeping, etc.

5.8 A mesqa improvement package may or may not be part of the MOU. A mesqa improvement package is viewed as a major economic incentive to forming an association. It is not that a BCWUA cannot be formed without the improvement package. It is simply that the opportunity costs in doing so are not insignificant, and as with the participation in O&M contracts, the improvement package provides additional economic incentives to organize the BCWUA at the same time that the mesqa improvement package is being made available.

6. Overall Value of the Cost-Sharing Framework

It is believed that by using the proposed cost-sharing framework, the BCWUA will over time slowly begin to operate the branch canal with some essential managerial, fiscal and water record keeping, and dispute resolution skills. O&M contracts for BCWUAs are being used to provide an initial economic incentive to develop the association. BCWUAs would gradually grow out of the need for government contracts, as they (1) catch up on deferred maintenance, (2) develop ways of reducing O&M costs through better canal management, and (3) develop their own sources of revenue through annual O&M assessments or other sources of revenue.

The use of contracted payments would be minimized over time as the more business-oriented BCWUA develops its own (1) O&M assessment that is used to pay for a (2) small office staffed with one or two clerks, (3) a small field staff of patrollers sufficient to maintain branch canal structures and the optimal management of canal reaches for the mesqas, (4) some light equipment to assist in maintenance work, (5) a fully developed record keeping program, and (6) bylaws and rules and regulations.[43]

Any cost-sharing program should provide GOE, the implementing agency, and farmers various alternatives or "pathways to suit various social situations and branch canal operating cost conditions. The proposed cost-sharing framework does this.

First, it takes into consideration various categories and levels of branch canal O&M costs. Not all branch canal requirements are the same. Known differences will be reflected in the awarding of contracts, or the awarding of benefits for future mesqa improvement packages.

Also, the program takes into consideration probable differences in farm income from one area to another. This is important because of the relationship between farm income and the ability of farmers to financially participate in branch canal cost-sharing. The negotiated three-year plan is tied to the financial ability of farmers to advance forward. Poor farmers are not penalized, nor are rich farmers favored in the program.

A great part of developing the cost-sharing pathway for the BCWUA will require input from farmers. This will involve a negotiating process between GOE and the BCWUA council over the level of branch canal operation and maintenance to be assumed in the contracts, and activities pledged by GOE for mesqa improvement when an improvement package is available. The following are additional benefits:

- Ease of process documentation and the ability to monitor and evaluate progress in water users association development quantifiably over time. Most of the institutional performance targets (5.4.1 through 5.4.4) can be easily measured. They can also be

[43] Neighboring branch canals, although organized separately, could share an office, staffing, equipment and record keeping program to achieve economies of scale.

given degrees of completion, allowing for re-negotiation to occur with explicit renewed performance targets if another three-year plan is needed.

- Minimal complications with present policy regarding the need to use certified contractors for work on branch canals or mesqas. Minimal demand for new administrative procedures, and requiring no additional legal framework to speak of, other than legal status for the association.
- Once in place, the program can be easily replicated, and applicable to both the presence and absence of mesqa improvement packages.
- Designed similar to established cost-sharing and conservation reserve programs practiced in other countries that have shown capability of being administered effectively, and with results.
- Suggests degrees of decentralization of public institutions and gradual reduction in GOE irrigation budgets.
- Does not require immediate setting up of agricultural credit and agricultural loans for branch canal associations, although this would be highly recommended in the future.
- Is performance-based, and does not involve the handing over of government resources without some proven ability to administer these resources effectively.
- Through the memorandum of understanding and targeting of goals over a span of time, the framework provides a means for farmers to employ greater voice in O&M matters, improving communication between farmers and agencies, monitoring their own performance, and having greater capacity to assist in the implementation of mesqa organization and improvement packages in the future.

7. Cost-Sharing Plan Worksheets for Qemri and Bahr-El-Darham Bcwuas44

What follows is an example cost-sharing plan developed for one branch canal, the Qemri branch canal in the Sharaqaia Directorate, some distance outside of Zagazig. Worksheets A through G are *three-year cost share planning worksheets* for the branch canal association. Although this particular association has provided important input on its willingness to engage in O&M contracts, it has not formally gone through the process discussed here, not has it been exposed to the concept of negotiating through these worksheets. This would be provided through a future workshop. Details and a schedule of activities for this framework is shown on pages

There are believed to be opportunity costs associated with branch canal association development. Farmers presently do not contribute to branch canal O&M, either through an assessment or through voluntary labor mobilization. To reduce some of these opportunity costs, the Ministry is considering allowing these associations to enter into O&M contracts with the government to do annual O&M, instead of having private contractors do the work.

Worksheets A through G are what the branch canal association sits down and works up with the government during the so-called negotiation process over its three-year plan. Upon completion, these worksheets constitute a three-year target for the association. Undershooting or exceeding this three-year target will allow the association and government to measure progress in association development, as well as providing the basis for subsequent three-year plans. The negotiated three-year plan, documented through these worksheets, is then finalized in a memorandum of understanding (MOU) between the association and the government. Final versions of the worksheets are attached to the MOU.

The cost-sharing framework discussed in the main body of this report targets costs associated with the operation and maintenance of branch canal systems in Egypt. These are shown in Worksheet B. They may vary slightly from one branch canal to another. The negotiation involves cooperation between the (1) Ministry and (2) branch canal associations in sharing information on the actual cost of these expense items over time. This is needed to develop the five-year base value.

These branch canal associations would be governed by an elected council, have bylaws, be a legal entity, and have perhaps a small office and staff, including patrollers trained to measure water and maintain records. The association would levy a small annual O&M assessment to cover its costs, in addition to continued government financial assistance at some level. These institutional targets would be negotiated in the three-year plan. They would be part of the MOU. The whole process will take time, but the proposed cost-sharing framework presented in Worksheets A through G initiates the process.

[44] The cost-sharing plan Worksheets for Bahr-el-Darham BCWUA can be found in Chapter 5 of the Main Document of this report.

Farmers, through their branch canal association, have indicated in focus groups that they are willingness to do contracts for certain items at present. As the association strengthens over time, it will gradually take on more O&M responsibilities, including actually reducing the annual cost to the government in maintaining branch canal systems throughout Egypt. At present, the program is not designed to reduce actual outlays made by the government, but rather to give added value to these outlays.

Added value is achieved through the association doing more work, and at a better quality than the private contractors. This is an empirical question, but if true, would stretch current government expenditures further and generally reduce the rate of depreciation of canal systems over time. There are many *social benefits* suggested from this program that cannot easily be measured in economic terms; such as more local control, better oversight of the system, improved relations between farmers, etc.

The proposed cost-sharing framework is cast in acceptable and defensible economic and business (accounting) terms. What follows is a discussion of these *cost-sharing worksheets* that are worked up by the branch canal association and government during negotiations over the three-year plan:

Worksheet A

Worksheet A is a description of the various forms of cost savings to the government that are expected to occur as a result of participation of the branch canal association in O&M contracts. There are four: 1) added value given to government expenditures by the elimination of the private contractor's profit margin, 2) reduction in the depreciation rate of the canal through better quality work performed by the association over that of the contractor, 3) promotion of a small annual O&M assessment by the association as part of the cost-sharing framework, and in order to employ at least one canal patrolman, and, 4) promotion of branch canal association participation in assisting the government in developing mesqa associations where needed, thereby reducing the cost borne by the government in conducting these activities.

Worksheet B

Worksheet B shows the results of negotiation between the branch canal association and the government regarding the setting of the five-year base value for O&M costs. The example shows that it was estimated, after careful consideration of all O&M expense categories, and including information obtained from five-years worth of costs, that it would cost approximately LE 48,680 annually to operate the Qemri branch canal. Each branch canal would have its own base value.

The base value does not necessarily represent the sum total of what is currently being spent by the government in operating and maintaining the branch canal, only what is believed to be necessary to maintain it optimally. It represents a fair market value for the

goods and services (including machinery and the like) required to achieve an adequate level of annual O&M. It does not reflect any cost for rehabilitation as a result of deferred maintenance in the past, although it could. Expense items associated with deferred (catch-up) maintenance would simply be additional expense items (rehabilitation expense items) added to the worksheet.

Worksheet C

Worksheet C shows the negotiated three-year plan, representing what the branch canal association is willing to undertake in the way of O&M tasks. In the example worksheet, there were some expense items that the association was only willing to assume 50% of the responsibility for, financed either through a small annual O&M assessment or through voluntary labor contributions. There were other expense items which the association was generally willing to assume 100% of the responsibility for. There are also several expense items that the association was not willing to assume any responsibility for (0%).

However, except for the items it has agreed to cover completely (100%), the association may enter into O&M contract work with the government for any or all of the other items. The next worksheet (Worksheet D) shows both the association's decision about, and expected revenue from, O&M contracts.

Worksheet D

Worksheet D shows the association having agreed to perform O&M contract work for a variety of items, such as weed control, manual dredging, pitching, and some maintenance of bridges. As shown in the worksheet, it will earn a little revenue from each of these contracts. About 15% of this revenue represents what was once the private contractor's profit margin. This profit margin will now go to the association's contingency fund. The remaining 85% will go to paying for whoever conducted the work for the association.

Note that the government does not save any money here by having the association do the work, but the government does see part of its funds going to the association's contingency fund, to be used to address deferred maintenance sometime in the future. However, this can only happen if the association conducts the O&M contracts at a fair market value. This is why the development of the five-year base value is so important. Of course, the association is being developed too during this process.

Worksheet E

Worksheet E shows the distribution of revenue and expenses of the association across the three-year plan. This worksheet would be completed and finalized, as with all the others, during the negotiation process leading to the memorandum of understanding (MOU). It represents the expected revenue and expenses for each year. A reconciliation at the end

of the three-year plan might show that the association had exceeded or undershot its original targets. This information would constitute grounds for assessing the scope of a second three-year plan, possibly including or excluding various expense items negotiated for the first three-year plan, but found to be unrealistic or easily achieved for/by the association.

Worksheet F

Worksheet F simply shows a three-year total for all of the revenue and expenses. It would be compared against the final three-year total. In fact, both Worksheet E and F would have negotiated and final result versions.

Worksheet G

Worksheet G is a simple balance sheet for the association, showing a balance of assets and liabilities at the conclusion of the three-year plan. The values shown on this worksheet assume that all of the projected targets in our example three-year plan were met exactly, which is often unlikely to be the case when associations go through this process.

Worksheet H

Worksheet H is really not a worksheet in the sense of the others, but rather a discussion of how some of the values for expense items in the example were arrived at. There is also descriptive information on each expense item. A similar discussion was not developed for the revenue accounts (the "300" numbers) because of their more or less self-explanatory nature.

WORKSHEET A

Qemri Branch Canal Association		
ESTIMATED COST SAVINGS TO GOE		
The policy of allowing the branch canal associations to perform O&M contract work for the Ministry is designed to improve the allocation of these funds and to obtain greater benefits from these expenditures. Government funds are administered more efficiently, the rate of depreciation of canal assets is reduced, and farmers are given much needed economic incentives to assume more responsibility for the protection and management of these assets.		
ANTICIPATED SAVINGS TO GOVERNMENT		
1) Awarding O&M contracts to canal associations, and at approximately the current cost rate, would allow the association to build up a reserve account over time. This reserve account can be used to further improve the irrigation system, either physically or through more full time management with patrollers, etc. The association can build up a reserve account because it operates at cost. It does not charge the government an overhead cost or profit margin on the O&M contracts. The economic value of this policy can be measured by the rate of formation of the reserve account, as well as the additional O&M work on previously deferred maintenance undertaken by the association with this capital fund.		
2) Awarding O&M contracts to canal associations is expected to reduce the rate of depreciation of these government assets over time. This is accomplished in the following way. Although it needs to be empirically verified, it is believed that the association will do more careful work, thereby minimizing the cost of future rehabilitation as well as increasing the length of time before maintenance needs repeating. Farmers, represented by their association council, depend upon the canal for their livelihood, while the private contractors normally doing the same O&M contract do not.		
3) The current cost-sharing plan recommends that the association introduce an annual assessment as its contribution toward operating and maintaining the branch canal. The association makes benefit of the new policy on O&M contracts, in return for agreeing to initiate this assessment; however small it is. This assessment represents additional revenue to increase patrolling of the canal, and to catch up on critical deferred maintenance. Activities such as these undertaken by the association also reduces the rate of depreciation of		

WORKSHEET A

Qemri Branch Canal Association		
the irrigation system.		
4) Branch canal associations can minimize government costs associated with efforts to organize smaller associations at the mesqa level. Initially, a branch canal association is developed and at a certain point in time begins to assist Ministry staff in organizing smaller mesqa associations. Over time, this will gradually reduce the required number of Ministry staff needed to form these mesqa groups.		

WORKSHEET B

Qemri Branch Canal Association

FIVE-YEAR BASE VALUE OF O&M COSTS

This is a negotiated value, based on the documented average cost of operating and maintaining the branch canal over the previous five-years. Negotiations between the Ministry and the BCWUA council occur after an examination of cost records, leading to an agreed upon base value. This base value is the basis of contract reimbursement rates to the BCWUA by the Ministry upon completion of O&M performed by the association. Private contractors have been doing most of the O&M work up to this time. Records of payments to private contractors could be consulted in this process. The association would be awarded a reimbursement upon fulfillment of contract specifications.

AVERAGE ANNUAL O&M COST PER YEAR, BY EXPENSE ACCOUNT

	Estimates (LE)
401 - Salaries - canal patrolling (supervision of mesqa demand and canal	5,100
402 - Salaries - office clerk/patrolman (fiscal and water delivery record keeping)	2,550
403 - Wages - casual labor	1,200
404 - Equipment and supplies (trash rakes, tools)	200
405 - Council stipend (for meetings, trips, coordinating activities)	200
406 - Special services (auditing, consultative)	200
407 - Rental fees (for small storage facility or office)	2,400
408 - Vehicle maintenance (small motorcycle, tractor)	3,000
409 - Fuel (tractor, motorcycle)	4,000
410 - Weed control (machine)	2,500
411 - Weed control (manual)	2,500
412 - Dredging - trash removal (machine)	12,000
413 - Dredging - trash removal (manual)	6,600
414 – Pitching	1,000
415 - Rip rap	1,000
416 - Maintenance of bridges	1,000
417 – Drainage	1,000
418 - Depreciation/Contingency fund	0
419 - Mesqa WUA development	1,000
420 - Bank fees	20
421 - Other expenses	10
Total annual cost of branch canal operation and maintenance	**47,480**

WORKSHEET C

Qemri Branch Canal Association

THREE-YEAR ASSOCIATION DEVELOPMENT PLAN

The BCWUA evaluates its capability in meeting various expense account items. Some expense items would be covered by the Ministry, as in the past, while other items would be assumed by the association. One-hundred percent (100%) means that the BCWUA would assume all of the costs of the particular expense account. Zero percent (0%) means that the association will not assume any of the costs of the expense items. Fifty percent (50%) would mean that the Ministry would cover the remaining 50% of expected cost. The willingness of the BCWUA to enter into O&M contracts for any items they do not meet one-hundred percent of the cost on is shown on the next page.

PROPOSED BCWUA COST-SHARING BY EXPENSE ACCOUNT

(The BCWUA percentage is financed through its own O&M assessment)	Year 1 %	Year 2 %	Year 3 %
401 - Salaries - canal patrolling	50	50	100
402 - Salaries - office clerk/patrolman	50	50	100
403 - Wages - casual labor	100	100	100
404 - Equipment and supplies	100	100	100
405 - Council stipend	100	100	100
406 - Special services	100	100	100
407 - Rental fees	0	0	0
408 - Vehicle maintenance	100	100	100
409 – Fuel	100	100	100
410 - Weed control (machine)	0	0	0
411 - Weed control (manual)	0	0	0
412 - Dredging – trash removal (machine)	0	0	0
413 - Dredging – trash removal (manual)	0	0	0
414 – Pitching	0	0	0
415 - Rip rap	0	0	0
416 - Maintenance of bridges	0	0	0
417 – Drainage	0	0	0
418 - Depreciation/Contingency fund	0	0	0
419 - Mesqa WUA development (task already completed)	0	0	0
420 - Bank fees	100	100	100
421 - Other expenses	100	100	100

WORKSHEET C

Example #1 - For account #401 above, which is estimated to cost LE 5100 per year (see base value on previous page), the association agrees to cover 50% in year 1 and 2. This all the resources it can bring to bear on the expense item, and will be paid out of a small annual assessment. The other 50% would be covered by the Ministry, but as shown on the next page, the association would contract with the Ministry to perform this remaining 50%. In other words, it would do this remaining 50% as part of an O&M contract. In year 3, the association would feel capable of assuming all of the cost of this particular expense item, probably as a function of wanting to exercise more local control.

Example #2 - For accounts #412-413, which are estimated to cost LE 12,000 and LE 6,600 per year (see base value on previous page), the association has not agreed to cover any of the cost. They are large expense items, and #412 involves the use of heavy equipment which the association does have access to. However, as will be represented on the following page, the association feels capable of at least entering into an O&M contract for doing some of the manual dredging and trash removal (#413).

WORKSHEET D

WORKSHEET D

WORKSHEET D

Qemri Branch Canal Association

PROJECTED ASSOCIATION REVENUE FROM O&M CONTRACTS

The Ministry has indicated a willingness to allow BCWUAs to perform O&M contracts in place of the use of private contractors. The BCWUAs have indicated a willingness to do this. The question is, what kinds of contract work will the BCWUA be willing to do. The Qemri Branch Canal Association has indicated a willingness to do the following. It is important to view the anticipated reimbursements received by the BCWUA from the Ministry for fulfilling O&M contracts as revenue for the association.

O&M CONTRACT (and association revenue) BY EXPENSE ACCOUNT

	Year 1	Year 2	Year 3	
*401 - Salaries – canal patrolling	2,550	2,550	0	
*402 - Salaries – office clerk/patrolling	1,275	1,275	0	
403 - Wages - casual labor	0	0	0	
404 - Equipment and supplies	0	0	0	
405 - Council stipend	0	0	0	
406 - Special services	0	0	0	
407 - Rental fees	0	0	0	
408 - Vehicle maintenance	0	0	0	
409 – Fuel	0	0	0	
410 - Weed control (machine)	2,500	2,500	2,500	
411 - Weed control (manual)	2,500	2,500	2,500	
412 - Dredging – trash removal (machine)	0	0	1,200	
413 - Dredging – trash removal (manual)	2,000	2,000	2,000	
414 – Pitching	1,000	1,000	1,000	
415 - Rip rap	0	0	100	
416 - Maintenance of bridges	1,000	1,000	1,000	
417 – Drainage	0	0	100	
418 - Depreciation/Contingency fund	0	0	0	
419 - Mesqa WUA development	0	0	0	
420 - Bank fees	0	0	0	
421 - Other expenses	0	0	0	
Total O&M revenue	**12.825**	**12.825**	**10.400**	**36.050**

WORKSHEET D

This worksheet indicates that the branch canal association has agreed to perform certain O&M contract work, for which it will earn revenue. Above it shows that the association earned LE 36,050 through O&M contracts over the three year period. Some of this revenue goes to paying whomever conducted the work in the name of the association. A small percentage of the O&M contract revenue (15%) goes to account #418, which is a depreciation/contingency fund (see next page).

For items marked (*), the Ministry would generally not award O&M contracts for these expense items if the association is unwilling to cover at least a small percentage of the cost. This is why revenue from O&M contracts is earned from these items in year 1 and 2. In year 3 the association would cover the entire cost.

WORKSHEET E

Qemri Branch Canal Association

YEAR BY YEAR TOTALS - REVENUE AND EXPENSES

The BCWUA operates as a nonprofit association, meaning that it operates at cost. A percentage of O&M revenue is allocated by the BCWUA to a depreciation account or contingency fund (#418). The BCWUA is able to do this because it does not charge the Ministry an overhead cost or profit margin. The #418 account represents a savings to the Ministry. This is in the form of added value from additional O&M work that the association will fund through this account in the future. This represents added value above what the private contractors would provide.

REVENUE ACCOUNTS				
301 - O&M Revenue (Ministry reimbursement to BCWUA)	12,825	12,825	10,400	
302 - BCWUA Assessments (LE 1.50 per feddan)	10,500	10,500	10,500	
303 - Jobbing (work performed by BCWUA for mesqas)	0	3,500	3,500	
304 - Contributions (Voluntary labor by members)	39	0	2,549	
305 - Cash gifts, and donations	0	0	0	
306 - Grants (Government, NGO, or private sector)	0	0	0	
Total revenues	**23,364**	**26,825**	**26,949**	**77,138**
EXPENSE ACCOUNTS				
401 - Salaries - canal patrolling	5,100	5,100	5,100	
402 - Salaries – office clerk/patrolman	2,550	2,550	2,550	
403 - Wages - casual labor	1,200	1,200	1,200	
404 - Equipment and supplies	200	200	200	
405 - Council stipend	200	200	200	
406 - Special services	200	200	200	
407 - Rental fees	0	0	0	
408 - Vehicle maintenance	3,000	3,000	3,000	
409 – Fuel	4,000	4,000	4,000	
*410 - Weed control (machine)	2,125	2,125	2,125	
*411 - Weed control (manual)	2,125	2,125	2,125	
*412 - Dredging – trash removal (machine)	0	0	1,020	
*413 - Dredging – trash removal (manual)	1,700	1,700	1,700	
*414 – Pitching	850	850	850	
*415 - Rip rap	0	0	100	
*416 - Maintenance of bridges	850	850	850	
*417 – Drainage	0	0	90	
418 - Depreciation/Contingency Fund (15% of O&M revenue)	1,924	1,924	1,560	
419 - Mesqa WUA development	0	0	0	
420 - Bank fees	20	20	20	
421 - Other expenses	10	10	10	
Total expenses	**26,054**	**26,054**	**26,900**	**79,008**
Excess of revenues over expenses	**(2,690)**	**771**	**49**	**(1,870)**

The accounts marked (*) shows their expense after crediting 15% to account #418. Notice that there was a modest negative balance in the revenue. This would indicate a possible need to increase the

annual assessment slightly (account #302) to create a zero balance in the next year or plan, which is the objective of a nonprofit association.

WORKSHEET F

Qemri Branch Canal Association			
THREE-YEAR TOTALS - REVENUE AND EXPENSES			
REVENUE ACCOUNTS			
301 - O&M contracts (Ministry reimbursements to BCWUA)	36,050		
302 - BCWUA assessments (LE 1.50 per feddan)	31,500		
303 - Jobbing (work performed by BCWUA for mesqas)	7,000		
304 - Contributions (voluntary labor contributed by association members)	2,588		
305 - Cash gifts and donations	0		
306 - Grants (government, NGO or private sector)	0		
Total revenues			**LE77,138**
EXPENSE ACCOUNTS			
401 - Salaries - canal patrolling (900 man days)	15,300		
402 - Salaries - office clerk/patrolman (450 man days)	7,650		
403 - Wages - casual labor (900 man days)	3,600		
404 - Equipment and supplies (trash rakes, tools)	600		
405 - Council stipend (for meetings, trips, coordinating activities)	600		
406 - Special services (auditing, consultative)	600		
407 - Rental fees (for small storage facility or office)	0		
408 - Vehicle maintenance (small motorcycle, tractor)	9,000		
409 - Fuel (tractor, motorcycle)	12,000		
410 - Weed control (machine)	6,375		
411 - Weed control (manual)	6,375		
412 - Dredging – trash removal (machine)	1,020		
413 - Dredging – trash removal (manual)	5,100		
414 – Pitching	2,550		
415 - Rip rap	100		
416 - Maintenance of bridges	2,550		
417 – Drainage	90		
418 - Depreciation/Contingency fund	5,408		
419 - Mesqa WUA development	0		
420 - Bank expenses	60		
421 - Other expenses	30		
Total expenses			**79,008**
Excess of revenues over expenses			**(1,870)**

Qemri Branch Canal Association

STATEMENT OF ASSETS AND LIABILITIES

ASSETS

BRANCH CANAL ASSOCIATION ASSETS (current assets)		
Cash (from expense account #418)	1,241	
Accounts receivable (Ministry reimbursements forthcoming)	0	
Inventory (materials, supplies)	200	
Savings account (from expense account #418)	1,000	
Prepaid expenses	0	
Reserve account (Remaining balance of expense account #418)	3,167	
Total current assets		**5,608**
GOVERNMENT ASSETS (fixed assets)		
Land and buildings	350,000	
Equipment	12,000	
Other fixed assets	3,000	
(Less depreciation)	(50,000)	
Total fixed assets		**315,000**
OTHER ASSETS		
Long-term investments	0	
Enter other assets here	0	
Enter other assets here	0	
Total other assets		**0**
Total assets		320,608

LIABILITIES AND EQUITY

CURRENT LIABILITIES		
Accounts payable	1,870	
Short-term loans payable	0	
Other current liabilities	0	
Total current liabilities		**1,870**
LONG-TERM LIABILITIES		
Long-term loans payable	0	
OTHER LONG-TERM LIABILITIES	0	
Total long-term liabilities		0
EQUITY		
Net equity	0	

Retained earnings	318,738	
Total equity		318,738
Total liabilities and equity		**LE320,608**

More Detailed Description of the Expense Accounts

Expense Account Numbers

401-2 Costs associated with these two expense accounts are based on local rural labor rates for semi-skilled people operating small hydraulic equipment, driving a vehicle, and with some primary education. They are not based on salary levels for such comparable work within the Irrigation Department. Specific activities associated with this account have not been completely defined at this time. However, see Appendix B (description of BCWUA canal patrolling and office management and record keeping). As part of the cost-sharing performance targets outside of O&M contracts with GOE, the BCWUA would investigate its ability to hire one or two branch canal patrollers to maintain records and supervise (1) the level of water in branch canal reaches, (2) rates and timing of mesqa pumping and, (3) conducting light maintenance work. BCWUA patrollers would be full time positions. BCWUA office management might be a part-time position (limited hours of a small BCWUA office during the day). The cost of branch canal patrollers is estimated at 15 to 20 LE per day in rural areas for a semi-skilled employee able to operate a tractor, small hydraulic equipment, make repairs to motorcycles, and observing and recording water measurements after proper training. This would be for approximately 300 days a year.

The example shows that during the first two years, the BCWUA was reimbursed by the Ministry for expenditures incurred in these accounts. For the third year, the BCWUA assumed the full cost of these accounts. Also, during the first two years, a patroller was hired at part-time, rather than at full time. This is in keeping with some expected need for the BCWUA to explore the value and use of patrollers.

403 Specific activities and costs associated with this account include the hiring of casual labor for miscellaneous O&M tasks in excess of those itemized under other accounts below. As an example, Account #103 would generally not include casual labor hired by the BCWUA to perform work associated with an Irrigation Department O&M contract undertaken by the association. Account #103 represents O&M work performed by the BCWUA entirely on its own, without any reimbursement from the Ministry. The cost of casual laborers is estimated at 8 LE per day in rural areas.

404 This account defines BCWUA expenditures to maintain a small store of provisions for branch canal maintenance, including essential equipment for removing trash, shovels, lumber, rebar, gabion, spare parts for mesqa pumps, pipe, cement and an assortment of carpentry and masonry tools. This store of equipment and goods would be built up over time, with purchases coming from the association" s capital reserve account or annual assessments.

405 This account represents costs incurred by council members for attending meetings, and time spent by them in providing special assistance to individual farmers to (1) resolve special problems that cannot be addressed by the BCWUA patrollers, (2) assisting mesqa associations in their formation, or (3) addressing issues associated with the planning of land leveling in mesqa areas, etc. The importance of Account # 105 is in keeping with the expressed desire by farmers in focus groups to solve water problems locally whenever possible, and without the intervention of local police or the Ministry.

406 This account includes possible costs associated with the auditing of BCWUA records, and legal requirements associated with BCWUA registration, other government or Ministry requirements, etc. It is not anticipated at this time that Ministry funds would be available for such expenditures. Furthermore, such expenses may be minimal initially.

407 This account would be defined by expenses associated with renting small office, storage facility, etc. Rental fees for a small 16' x 16' storage shed might be about 200 LE per month in rural village areas.

408 This account is associated with costs in maintaining vehicles, such as motorcycles for patrollers, a tractor, carts, etc. Maintaining a motorcycle, including daily mileage of about 30 kilometers, is estimated at 20 LE per day. The cost of a 1 ton, 4 cylinder pickup truck would be about 100 LE per day, including mileage. This cost estimate would be for a BCWUA tractor as well.

409 This expense account shows the cost of all fuel, whether for vehicles or other purposes, consumed by the BCWUA while conducting expense account activities it undertakes on its own. This would generally not include fuel costs under O&M contracts.

410-
410 This account is apparently of great interest to farmers. During focus groups, farmers indicated the desire to conduct weeding themselves (through the association), rather than having private contractors do this work. These accounts would be the source of major accounts for BCWUA contracting with the Ministry.

412-
413 This is generally the account with the highest costs. In focus groups, farmers have indicated that all costs associated with canal dredging, presumably including labor as well as machinery costs, would not be undertaken by the BCWUA through O&M contracts. This is because of the need for large earthmoving equipment and associated skills. However, it is not clear if this means that farmers, through their BCWUA, would be unwilling to engage in O&M contracts for manual dredging, as opposed to mechanical dredging. In any event, only

minimal costs associated with these accounts are borne by the BCWUA during the third year. This reflects some growing capability over time of BCWUA participation in this account category.

414 This account is represented by labor and possible fuel costs associated with this annual activity.

415 This account represents unique costs of purchasing, or otherwise acquiring, and transporting rip-rap. Again, nominal participation of the BCWUA in the third year to reflect growing capability.

416 Focus groups with farmers indicated a general unwillingness to participate in this account. Costs borne by the BCWUA for conducting minor maintenance on bridges, or the value of O&M contracts undertaken by the association occurs at a very minimal level in year three. This reflects an expected growing capability of the BCWUA to participate in this account.

417 This account may be incurred or assumed by BCWUAs in the future, and may have several cost items including, removal of trash and weeds, supervision of drains, pumping, and repair or installation of drains (see discussion in report).

418 This account is charged against the revenue collected from O&M contracts. It is used as a capital reserve fund for the association.

419 Mesqa WUA development can be assisted by the branch canal association. When this occurs it is a cost item for the association.

420 Fees charged for a checking account.

421 Other expenses.

8. Branch Canal Association Performance Targets

In the report, mention is made of four performance targets that would be considered for adoption by the branch canal association, and as part of the negotiation of the three-year plan. These targets included: 1) developing bylaws and rules and regulations unique to the needs of the branch canal association, 2) initiating a patrol, or patrols on the branch canal, 3) establishing a small office for the association, and, 4) initiating a modest annual O&M assessment to cover expense items borne by the association. What is presented in this appendix is a discussion of some of the merits and issues associated with each of these performance targets.

It is recognized that, under present allocation of water in Egypt, there is somewhat less emphasis on the concept of water rights, water permits or certificates, and rules of allocating water as part of the water users association development process. In Egypt, water supply is often not so much an issue as proper maintenance and protection of the canal system; although in many instances the presence of the latter may often belie the assumption that the former does not exist.

Egypt is currently favored with a water surplus, although future conditions could change this. However, the present absence of water scarcity does not drive the need to have strict allocation rules, water rights, adherence to beneficial use, and the like. Rather, the issue is maintenance of canal systems.

Yet this fact does not appear to obviate the need for any of the proposed water users association performance targets. This is because each target can be said to directly address canal maintenance. An association is still needed to govern various maintenance occurring in the branch canal. There is still the need for rules of conduct in regard to the disposal of trash, use or misuse of bridges, protecting downstream regulators, addressing excessive drainage, managing money in branch canal association accounts, dispute resolution, and so on. Some of the following issues can be addressed through bylaws.

I. Bylaws and Rules and Regulations

What can be said about the purpose and need of bylaws and rules and regulations? There are already government policies pertaining to the nature and scope of association bylaws. It is not intended here to suggest blueprint bylaws, only to indicate some of the issues perhaps needing consideration. The government already has a bylaw format for mesqa associations. What follows is a brief discussion of some of the considerations that might be taken into account when addressing the issue of bylaws for branch canal water users associations.

Each branch canal association will be expected to have its own unique set of bylaws. In fact, it is highly recommended that the association council draft an initial set of bylaws shortly after it is formed, and have these bylaws ratified by the landowners irrigating in the branch canal service area before engaging in O&M contracts.

This can be done by the council, perhaps using a special standing committee, and then presenting a draft of bylaws at one or two general assembly meetings. The bylaws crafted by the association can be amended in the future as needed. It is not recommended that this step be put off, simply because it appears to involve direct discussion of branch canal management. Working on bylaws really helps frame the nature, purpose and limits of the branch canal association. Upon completion of the drafting of such bylaws, farmers are better able to see and understand what responsibilities the association will be undertaking. It should be one of the first tasks of the association council. It certainly needs to come as an activity before entering into O&M contracts.

A branch canal association's bylaws would be cast within the general framework of national laws. These statutes and laws provide broad guidelines for individual water entities to cast their own governing laws. Generally, the broader the national laws, the more capability there is for these water entities to write bylaws that meet their own specific local needs. A "rubber-stamped" set of bylaws designed by the government for each and every branch canal association would not be recommended, and there is no evidence the Egyptian government is doing this. The umbrella national law would provide broad guidelines for what minimally should be included in association bylaws, then leaving the fine-tuning of bylaws to each and every branch canal association. Careful wording in national laws is needed to achieve this.

The following provisions are suggested as generally basic and central to the development of branch canal associations, although they are by no means all inclusive. Other provisions may be needed to meet government water resource policies, legal requirements, etc. However, the following are believed essential to a successful association development program:

a) The purpose of authorizing the existence of a water users association would be to make possible, insofar as legislation permits, an autonomous local entity that can assume full responsibility for managing the branch canal and overseeing the water allocated by the Ministry to the branch canal.

b) The association would be governed by a set of bylaws and rules and regulations developed by association members, clearly specifying the nature and conduct of all financial record keeping, O&M activities, and supervisory activities over the branch canal water supply, including the hiring of full-time and part-time employees to supervise branch canal supplies.

c) The association would be governed by a council openly elected by all association members, or otherwise according to the bylaws and rules and regulations of the association.

d) The association would be legislated powers by the government to temporarily terminate a member's access to water, or to impose other forms of penalties or fees as necessary, who clearly violates the bylaws and rules and regulations of the association, and to continue until such time that the association council deems that satisfactory restitution of the association member obligations have been redressed, and that the government come to the defense of the association if any form of legal action is attempted by the violating association member against the association.

e) The association would be given authority to terminate access to the branch canal by association members if such water users clearly injure the water supply of other association members, and until such time that those actions are stopped, but that the association would otherwise have no authority over how water is used by association members.

f) The association would be legally authorized to assume short or long term debt obligations as needed to finance irrigation system upgrading or emergency repairs, provided it is able to meet the collateral requirements of such debt obligations, but that the government would not be a party to such debt obligations unless it agreed to do so.

g) The association would possess the right of eminent domain in the irrigation system service area for the purpose of effectuating its common water supply, along with the ability to secure and protect right-of-way access specifically for the purpose of canal operation and maintenance or to otherwise protect important government property, including bridges and buildings.

h) The association would be permitted and required to maintain a complete association membership register (record) of the names of all association members, their addresses, the location of their land, the location of their mesqa, the names of other parties given permission by association members to use their water supplies, and a complete record of O&M fee payments made by association members.

II. Canal Patrols

There has been much discussion in this report about the role of branch canal water users associations (BCWUAs) in Egypt, and the extent of their responsibilities. Short of other needed administrative changes, such as legal recognition of these associations, it would seem that the hiring of one or two patrollers by such an association--with good training--and under the supervision of the association council, would be an enormously beneficial and low cost leap for these associations. It could advance the water users association development program considerably.

Expenditures by farmers for such an operational cost item would appear to have much lower opportunity costs than many of the more expensive maintenance costs associated with branch canal management. As a performance target, it is felt to be an important aspect of the proposed cost-sharing framework.

As background for this discussion, the implementation of continuous flow regimes in Egypt was designed to

- improve the availability of water to farmers
- improve delivery efficiency in earthen branch canals
- improve efficiency in mesqa pumping
- minimize excessive discharge from branch canals into drains
- reduce canal supervision needs

Generally, main canals in Egypt run continuously, but rotate their discharges to branches. There is an official rotation schedule of on and off days for discharges to branch canals, and for different irrigation seasons of the year. However, this rotation schedule to branches may be subject to periodic official change.

In any event, branch canals run continuously when they are receiving discharge from the main canal. In other words, we have continuous flow in the main canal, with intermediate rotation of branches, then again continuous flow in the branch canals. Automatic reading of the branch canal discharge from the main canal may or may not be present, as well as automation of down stream regulators. Manual readings are taken by the Irrigation Department at the branch canal discharge point.

Issues

Continuous flow regimes often require more intensive administration on a daily basis than rotation systems do. This may come as a surprise. Even with automation of downstream regulators in branch canals, there is regular need of oversight and supervision of flows. Automation does not negate the need for routine oversight. This is particularly true for earthen canals, perhaps slightly less so for earthen canals with near zero slope. To efficiently operate the branch canal and its many mesqa pumps under

continuous flow, regular daily readings of fluctuation in demand are needed. This might well include twice-a-day readings on:

- overall levels of branch canal reaches at several indicative data points
- an inventory of mesqa pumps in operation during any given 24 hour period (time and size)
- local mesqa pump forebay levels (the immediate mesqa forebay)

Simple charts with rating curves could be developed for branch canal association patrollers and used to calculate branch canal levels and mesqa pump discharges. There is no indication this is being done presently.

The proper administration of continuous flow is critical to the current branch canal water users association program in Egypt. The Irrigation Department, or the association, must administer the continuous flow in order to ensure adequate water depth for all reaches of the branch canal when these reaches are being drawn upon. Inadequate depth in reaches may lead to:

- inefficient and more costly mesqa pumping
- possible damage to mesqa pumps

These are important cost factors to farmers. Canal systems, particularly earthen canal systems, do not operate very well on their own, unattended. It is true that canals with zero slope and downstream regulators can certainly help reduce some of the labor associated with canal patrolling, but these engineering designs cannot by themselves totally eliminate the need for daily oversight by canal patrollers..

It is apparent that the BCWUA needs to be involved in the administration of canal reaches because the Irrigation Department does not have sufficient manpower to do this. As an example, one of the current pilot BCWUA branch canals, Qemri, has eighty-four mesqas. The service area of the Qemri system is about 7000 *feddans*. There are several service reaches in the canal. The availability of Irrigation Department patrollers to oversee withdrawals along the various canal reaches in Qemri appears inadequate.

Comparison to Other Situations

In Egypt, farmers in the various canal reaches are usually pull water at different rates, depending upon the number of mesqas in each reach, the period of time they are pumping, and their pump size and discharge relative to forebay levels immediately in front of the pump site. Many mesqas are pumping at any given time. In this, they resemble very much conventional gravity canal systems with many lateral headgates pulling water at various rates through weirs, and over different periods of time, in each canal reach.

Our example, the Qemri branch canal, would be considered a *large* irrigation system in the United States. This is because of the number of delivery points (at least 84 official ones) off the branch canal, relative to the size of the service area itself. Here, we define

large in terms of manpower needs. Perhaps as many as two or three ditch riders (patrollers) might be needed for a canal system of comparable size in the U.S., just to manage the various reaches of the service canal, and to collect data needed for equitable management. Of course, as canal gradient increases, more patrollers are generally needed to supervise flows.

Most irrigation districts and canal companies in the United States moved from simple rotation in the early years to continuous flow regimes, as practiced in Egypt, as they began to realize the benefits to farmers of making accessible in the service canal a continuous stream of water throughout the irrigation season. Earthen canals tended to operate more efficiently under continuous flow as well. However, this still required rather intensive management and record keeping; what is now commonly referred to as the utilization of a *call system*. These call systems are still employed, even with the presence of sophisticated downstream regulators. These call systems are really not conditioned by, nor the result of, water scarcity or canal slope. These call systems are used to manage the canal more efficiently, and work very well with rather simple indicative water measurements.

Call Systems

These "call systems" involve farmers on a lateral (equivalent to a mesqa in Egypt) placing water orders to their water association (the equivalent of a branch canal association in Egypt) a day or two in advance of need. Association ditch riders (patrollers in Egypt) collect these orders on a daily basis, usually twice a day. Lateral orders were, and are even today, submitted to ditch riders on little note cards, showing inches of water requested, and over a set lateral weir and period of time. All lateral orders are then pooled by the ditch riders or association manager (employed by the association). Using these pooled values, adjustments are then made in the downstream regulators of the main service canal (branch canal in Egypt) to meet the projected demand of all laterals over the next 24 hour period.

"Call systems" in the U.S. are usually operated on a 24 to 48 hour basis, meaning that farmers on the many laterals in an irrigation system must themselves pool and then place their water orders to the association's ditch riders 24 to 48 hours before they want to begin irrigating. In the old days, farmers on a lateral had no phone. One farmer would be selected on the lateral to place a little note card inside a box or jar at the lateral headgate, and showing the total pooled demand for that lateral; the amount of water that the farmers on the lateral wanted to pull from the canal. One summary note card was then collected by the ditch riders from each lateral headgate in the morning and afternoon and taken to the association office. In the office, a determination was then made about how to adjust the flow rate being pulled by the association canal from the river or reservoir, and what adjustments needed to be made in canal reaches to meet the next 24 hour water demand.

In this example, laterals show important similarities to mesqas in Egypt. They are demand points on the main service (branch) canal. Overall water demand could be

aggregated or pooled, based on daily information provided to the branch canal association by each mesqa. The one exception to this analogy in Egypt is that changes cannot generally be made in discharges from the main canal. This flow is set for the intermediate rotation period. However, this fact gives added weight to our analogy. There is a great need to manage branch canal flows and canal reaches even more carefully in Egypt, in order to ensure equity in access to available supplies.

Possible Implications for Egypt

It would seem that these "call systems" could be introduced to branch canals in Egypt as well, and with considerable benefits. How would such a call system operate in Egypt? It might work in the following way. The BCWUA would hire one to two well-trained canal patrollers, who early each morning and late in the afternoon would:

- record each mesqa pump in operation
- record the reading of its immediate forebay
- record several indicative gauges showing conditions in all branch canal reaches
- record the discharge into the branch canal at the main canal off-take
- remove trash from bridge abutments, and mesqa headgates and forebays

Of course, not all mesqas are taking water on any given day. This is important to remember. In addition, notification of (1) entry of mesqa pumps into the branch canal and ((2) exit of mesqa pumps out of the branch canal would be collected from mesqa leaders. Mesqa leaders would use a simply entry card, placed in a bottle or can near the mesqa pump. Branch canal association patrollers would collect these cards daily on their patrol, in addition to taking the above-mentioned water readings. Entry cards would show:

- expected time of mesqa entry into the branch canal
- expected time of mesqa exit out of the branch canal

Once data on current pumping, and incoming and exiting mesqas are collected in this way, it would be tabulated to determine the demand for each reach of the branch canal during the next 24 hour period. By experience it becomes generally known what fine tuning adjustments need to be made in the various downstream regulators. The point is that adjustments generally need to be made. The irrigation system operating with continuous flow cannot operate well on its own, unsupervised.

In this BCWUA management approach, each branch canal reach becomes a separate management unit. It is a leveling pond, or what they called in the old days in the U.S., equalizing basins. As water is pulled by various mesqas, adjustments are needed in each canal reach to ensure that all pumps have an adequate forebay; that canal reaches are being served according to the water demands tabulated in the morning or evening by the canal patrollers.

Current Problems

In our example, and apparently a somewhat typical branch canal, the Qemri branch canal has eighty-four mesqas. What the BCWUA does not know currently, and which is critical to its ability to provide timely and equitable water service, is what the demand is on the branch canal and its various reaches during any given 24 hour period. It is doubtful if all eighty-four mesqas are pulling water at the same time. Some mesqas have shut down for awhile. But where are those shutdowns? Who is in the branch canal, and who is out of the branch canal? These are critical questions for any water users association managing a branch or service canal. Downstream regulators will not totally eliminate these issues.

This information can only be obtained through the services of canal patrollers, along with rules and regulations in the association specifying that individual mesqas must notify the BCWUA in advance of their need to pull water, and for how many hours or days. They continue to get the water whenever they want. They may have it on holidays. They need to notify the BCWUA when they are going to pump water, and for how long.

The rate at which the water is pulled from the branch canal is set by the discharge of each mesqa pump and its forebay level. This makes it much easier in the context of Egypt for BCWUA patrollers to keep track of demand on the branch canal. Pump time and forebay measures would be taken twice a day. But they need the call system of entry cards and a small cadre of well-trained patrollers to manage this. The opportunity costs to farmers of paying a small assessment per *feddan* to hire one or two patrollers for their branch canal, would seem to be more than offset by the reduction of inconveniences associated with uncertainty about conditions in the canal reaches--whether they are going to have to "struggle with the irrigation system" today, or let the association patrollers monitor and optimize the system for them.

An important additional advantage to the Ministry in this regime, is that data tabulated on a 24-hour basis by the association canal patrollers could be summed for weekly and monthly demand reports, which could then be passed on to the local Irrigation Department and up to the Ministry to improve forecasting of water demand throughout a district; or an area served by a main canal. This could be a major means of addressing the mismatching problem of water delivery and demand in Egypt. One begins to see the immense importance of a BCWUA as the full implications of this local management capacity is realized in Egypt.

This is why it is important for the BCWUA program to focus on getting farmers to agree to fund the services of one or two patrollers, in addition to removing trash daily and protecting bridges. This would appear to be a far more appealing, and less opportunity cost-provoking step for the water users. The reason is that benefits can be realized within a few months. It should be a major performance target for the BCWUA as it negotiates with GOE over the O&M contracts and the responsibilities it is going to assume along with this program. The following would be needed:

- patroller training in water flows and water measurement
- flow rating and conversion charts that were easily interpretable

- development of patroller routes, schedules, and supplemental duties

Assistance would be provided by IAS in getting the patroller routes going, the rating charts developed, and the "call system" operating. In addition:

- a very nominal assessment would be levied per *feddan* by the BCWUA to pay canal patrollers
- IAS would help the association set up journals (or original books of entry) and ledgers to get their fiscal record keeping going (for a nominal assessment) and their water record keeping going.

Obviously, this needs to be discussed with farmers. However, experience has shown that it has great appeal as an initial stepping stone to association development. It was the first expenditure that irrigation districts and canal companies in the U.S. made during their startup.

One must ask the question why, under current and generally favorable water supply conditions in Egypt, there is even a rotation of (not within) branch canals in the first place, and therefore a limit on when farmers can receive water. In the western United States, with far greater water scarcity than in Egypt, a farmer can order and receive water any day of the week. Except in a very few, and now somewhat archaic, canal companies, rotation is never practiced except under extreme water shortage conditions. The call system discussed above has obviated the need for rotation of any kind. Much less engineering is required to operate the irrigation system efficiently because of real-time data on demand being provided through the call system. This is true for so-called run-of-the-river irrigation systems as well as irrigation systems with reservoir storage capacity.

Furthermore, the use of a call system obviates the need to design an irrigation system to serve 100% of demand should it occur. In such call systems generally only one-quarter to one-third of the farmers are pulling from the canal on any given day. The call system allows a mechanism for demand to be spread out more evenly over the course of the irrigation system. Smaller main canals can be designed.

When an attempt is made to engineer an irrigation system, such that there is no need for a water users association, one may have committed a serious mistake. When an attempt is made to engineer an irrigation system to meet maximum demand, one has generally over-designed the irrigation system. The problem is that canal engineering cannot replace the need for water users associations to report demand. One can certainly design a canal system to run without these associations, but it will be done at great expense, and probably leads to much greater inefficiency in operation in the long run. It is a mix of good engineering and water users association development that leads to good water management, rather than the absence of one or the other.

III. Bcwua Office and Water Record Keeping

At present, irrigation systems in Egypt are centrally managed up to the mesqa. However, the current water users association development program is designed to decentralize the irrigation system gradually over time.

This is to be accomplished through the development of branch canal water users associations (BCWUAs). Each BCWUA would be responsible for (1) administering water flows within a branch canal, (2) performing maintenance in the branch canal, and (3) developing water and fiscal record keeping capacities to better manage water supplies, improve equity in access, and plan maintenance activities. The Irrigation Department would pull back its oversight and administration approximately to the branch canal diversion point off the main canal. This would leave the BCWUA to operate and maintain the branch canal. This process would be phased in slowly.

In order to assume these responsibilities, the BCWUA would need a small office, with regular posted hours, which would:

- act as a central communication point for the BCWUA
- house a small BCWUA workforce of an office clerk/patroller
- oversee a small storage facility for equipment and supplies
- maintain records
- post notices
- receive O&M assessment payments
- hold monthly meetings
- hold education and training programs

This office would also provide a direct point of contact between the local Irrigation Department and the water users. The office would represent the water users on a day-to-day basis in all matters pertaining to the branch canal. Known office hours and postings would ensure that water users could get in touch with someone of authority when it is needed, whether the issue is an accident, trash, bridges, pumping, flooding, etc. However, one of the most important responsibilities of the association office is to maintain records.

Water Demand Record Keeping

In addition to developing greater participation of water users in branch canal management, the development of a viable BCWUA is greatly needed to reduce the mismatch of water demand and supply throughout Egypt. Many local water problems often appear to start from this mismatch.

With record keeping capacity, BCWUAs could perform a major task for the Ministry in monitoring and updating water demand throughout a District or Directorate. They would

do this through the hiring of a few well-trained canal patrollers to record mesqa demand daily throughout the branch canal service area. In this way, real-time data on water demand at the local level could be communicated through a system of information nodes beginning at the branch canal and moving up through the Irrigation Department to the Ministry.

In this framework, there is reduced need for the government to collect data on cropping patterns or crop water requirements to establish water demand. Cropping data are valuable for other purposes, but they are often time-consuming to collect and interpret for water demand purposes. Furthermore, there are many changes occurring in cropping from one season to the next that result in changes in demand that cannot be easily anticipated through cropping data. Real-time data is difficult to obtain through these means. Generally, real-time data on water demand can only be obtained through a reliable reporting mechanism that collects this data by way of reporting actual flows or pumping.

One of the features unique to Egypt is that water is pumped by mesqas. In doing so, at least some economic value, if not true marginal value, is being attached to water use. More importantly, information on branch canal demand would appear to be easily assembled from this mesqa pumping (see discussion of canal patrollers).

Types of Record Keeping Forms

The operation of an irrigation system is facilitated by the use of standard forms for reporting activities and keeping a permanent record of all water demands. These forms and records are an essential key to building an effective association, and its affiliated mesqa groups. Sound record keeping contributes to the development of trust and accountability between the association council, the association staff (office clerk and/or patrollers), and individual water users.

Such records are invaluable in insuring that any dispute arising over branch canal flows can be referred to a paper entry at some point in the irrigation season. It is felt that one cannot even consider the potential success of an association unless provision is made for the development and implementation of the forms and records discussed here; or close variations of them. Each branch canal association will develop its own unique forms depending upon local needs and procedures. However, the ones mentioned here are good guides.

The most valuable forms contain space for all essential information, simplified as much as possible. The records should be complete in order that the branch canal association staff and water users may be informed of what is going on, that unnecessary trouble over pumping may be averted, and that data be provided on which to base future desirable changes in the management of canal reaches. The information may also contribute to assessing the overall performance of the irrigation system, and may even suggest ways in which cropping patterns might be slightly adjusted to make better use of available water

supplies; although decisions about cropping patterns are the private decisions of individual farmers responding to their own income needs, market signals and interests.

There are essentially three groups of forms, of which one group is of critical importance. However, it is felt that all groups are needed. They are:

- Reporting forms of the branch association, consisting of daily, weekly and monthly water pumping summaries.
- Receipt books for receiving O&M assessments and forms for filing complaints, etc.
- Maintenance work orders or forms indicating the need for catch-up maintenance.

This first group of forms consists of those which are generally filled out by the branch canal clerk or patrolman during their regular daily round of the irrigation system. The nature of the forms emphasizes the importance of the patrolmen being individuals who can actually perform this task dutifully and correctly. It is felt absolutely essential that they be full-time employees of the association and have training.

This small staff must be accountable to the council, and the latter must be accountable to the General Assembly of all water users. The patrolman might be directly accountable to the office clerk of the association. It is felt that the process will not work if the patrolman is an employees of a government irrigation agency, or if authority over their actions are divided in any way.

It will be the responsibility of the office clerk and patrolmen to complete daily, weekly and monthly water report forms, and to submit them to the council at a monthly meeting. The information provided in these forms will enable the council to make informed decisions about the management of the branch canal. In addition, the patrolmen must be able to keep track of the flow conditions in the branch canal. Such information will also allow the office clerk to better plan the operation of the branch canal in subsequent days.

The Daily Water Report furnishes the office clerk with up-to-date information on water being pulled by all mesqas in the branch canal over a 24 hour period. This report is turned in by the canal patroller at the end of each day, after checking all of the delivery points in the patrolman's area of responsibility.

The advantage of a Weekly Report, and to a lesser extent a Monthly Report, is that the office clerk and patrolman have on hand information concerning all recent operations. The loss by a patrolman of his record book is very disturbing; hence the safe plan is to require daily reports, which are entered by the patrolmen into a weekly or monthly book before being submitted to the office clerk.

Gauge measurements on the branch canal reaches are needed daily and are usually secured by some form of dispatch. For permanent record, however, it is important that the original notes of the observer, in this case the patrolmen, are routinely recorded and signed by them, and periodically submitted to the association office clerk. A weekly Patrolman's Gage Record is a way of doing this. The time column allows the scheduled

time of observation and reading to be shown, which is generally sufficiently close for computations of discharge or flow. The "remarks" column can take care of irregularities.

Canal patrolmen required to read gages on measuring devices should be provided with discharge tables for the particular device used, for their own information and for the information of water users, even though field computations may not be required of them.

A Written Report of canal problems or dramatic change in water levels is valuable. Such reports should give the location, description and cause of a problem. Ample space should be provided for all descriptive matter and notes.

These are only some of the records that can be maintained. In addition, there are branch canal association Ledgers with the names of all water users, and including the address of the farmer, the mesqa location(s) of the farmer's land, whether the land(s) is/are owned or leased, the name of the lessee(s) if applicable, and the number of *feddans* irrigated on the farm(s). The latter is needed to determine the annual O&M assessment for each farmer.

There is also some essential financial record keeping needed by the association. This is discussed in the next section.

IV. An Annual O&M Assessment and Fiscal Record Keeping

Much has already been said about the need for a small annual assessment for the branch canal association. This assessment is needed, minimally, to set up a small office and to get at least one patrol going, with some record keeping. It is unlikely that farmers will be able to cover all O&M costs initially, or even in the near future. This is understood, but should be empirically verified with analysis of local farm budgets.

The annual O&M assessment does not have to be excessive, but instituting it will allow the association to become familiar with fiscal record keeping. It will allow the association to develop the original books of entry that are needed to manage both its own revenue sources, as well as revenue coming in, and payments being made for, O&M contracts. Even a very modest assessment of 25 piasters per *feddan* would allow this record keeping to begin. The assessment would not even have to finance very much, but rather be used to initiate the mechanics of this fiscal record keeping.

One of the most important aspects of starting up a water users association is the record keeping program for financial management. Voting by water users on such business items as bylaws, rules and regulations, and the size of the annual operations budget is more or less routine. The enterprise is operated like an agricultural cooperative. Financial record keeping is essential to it.

Many business studies have shown a close relationship between business failure and inadequate record keeping. The relationship between business failure and record keeping is no different for small canal associations than for any other kind of business venture, whether for profit or nonprofit.

Finally, record keeping will be valuable in the future, when credit services become more available to a newly formed association as it gains recognition in the community as a successful enterprise, and therefore a good credit risk for lenders.

The financial records of a nonprofit association begin with small bits and pieces of paper---petty cash slips, invoices for payments received, billing invoices, checks and check stubs, bank statements, and so on. These papers are important. They are the bricks from which the association will build its organized payment record. The office clerk of the association is daily entering information from these pieces of paper into Journals and Ledgers.

Information from billing invoices and the like are first brought together in one or more Journals---sometimes called "original books of entry." A journal is simply a record of these daily transactions. Each Journal entry generally shows; (1) the date of transaction; (2) a brief description of the particular transaction; (3) the amount of money involved in the transaction, and; (4) the particular expense account number affected by the transaction. Briefly, these Journals are:

Check Register Journal

This journal records all checks written daily and over the course of the year and is balanced at the end of each month. A typical bank account check book may not be adequately designed to meet the needs of this accounting procedure; hence the usefulness of a Check Register Journal.

Accounts Payable Journal

This journal is used to record all incoming bills and other costs incurred by the association throughout the year. This journal also records payment of bills, either through check or cash, and records the posting of these payments in either a General Ledger or a Revenue and Expense Ledger as having been paid. The General Ledger and Revenue and Expense Ledger will be discussed later.

General Journal

Some cost items for the branch canal association, although having specific account numbers and their own spreadsheets in either the General Ledger or Revenue and Expense Ledger, are typically infrequent in occurrence. Examples are pre-paid set-asides, where the association sets aside cash resources for future anticipated costs. Setting aside money for an annual note payment might be an example. Such items are entered in this journal.

Payroll Journal

This is a specialized journal for recording all transactions dealing with the payment of branch canal association salaries and wages, for an office clerk an/or canal patroller.

Water User Account Journal

This journal records all O&M assessment payments made by water users as they occur over the course of the payment period. There is generally a page or spreadsheet for each water user.

General Ledger

The two major ledgers are the General Ledger and the Revenue and Expense Ledger. These two ledgers are used to make the information that is daily recorded in one or more of the five journals mentioned above more usable for keeping track of various cost categories, and in projecting future costs. When an entry occurs in one of the five journals--or original books of entry--the information is later transferred, or ***posted***, to one of the two ledgers. These two ledgers have several account sheets (e.g., like spreadsheets) in them. Each of these account sheets is in turn a record of the increases and decreases in one type of revenue or expense item.

The General Ledger maintains a running record of various types of assets, liabilities, and equity (surplus) items. It has an individual spreadsheet for every numbered asset and liability account. Refer to Appendix A, Worksheet for a typical association balance sheet showing assets and liabilities.

Revenue and Expense Ledger

The Revenue and Expense Ledger maintains a running record of various types of revenue and expense account items. It has an individual spreadsheet for every one of a series of numbered accounts being used by an association. Refer to Appendix A, Worksheet E for a typical association revenue and expense sheet.

V. Summary

Since the branch canal association is not a for-profit retail enterprise, but rather a nonprofit water users association, the use of cash and managing cash receipts on a daily basis will be minimal. At most, there will be a petty cash account for incidental expenses, and petty cash receipts to record withdrawals and deposits into this petty cash account. Most bills incurred by the association would be paid by check when possible, with a checking account at a local bank.

Again, the main form of incoming cash to the association will be the O&M fee paid by the water users at, or shortly after, the beginning of the irrigation season. Other forms of payment are known, such as contributions of labor in lieu of cash payment. Also, some water users associations allow payment at the end of the irrigation season. However, experience has shown that requiring the water users to pay at the beginning of the irrigation season ensures that the association will have sufficient revenue to pay for seasonal operation and maintenance costs and employee salaries; and will not have to routinely utilize short-term notes drawn from the local bank to cover these costs.

O&M assessments paid by water users should be deposited by the office clerk at the end of each day in the association bank account. Again, all payments made by the association to vendors would ideally be made with checks drawn on the association bank account.

Paying of association bills would generally occur at the end of each month, after any remaining Journal entries were made. The General Ledger and the Revenue and Expense Ledger would be totaled out after all final postings, thereby balancing each and every numbered account each month. Of course, many accounts would be inactive in any given month, so the process of balancing accounts is not as over-whelming as it might first appear.

Furthermore, unlike a for-profit enterprise, there would generally be no need of the association producing a monthly financial statement. If the five Journals and the two Ledgers are totaled and balanced at the end of each month, it would be sufficient for the association to produce a financial statement for the water users only at the <u>end of the year</u>.

BCWUA Annual Report

Finally, as an important means of communication between the branch canal association and the water users it serves, the council, with the assistance of the office clerk and the canal patrolman, would put together a short annual report. This report would include a summary of all revenue and expenses (Appendix A, Worksheet F), as well as a summary of all assets and liabilities (Appendix A, Worksheet G).

In addition, there might be a short written report, discussing some of the highlights of the irrigation season and/or year, discussion of maintenance completed or deferred, and any information from the Ministry that it wishes to communicate effectively to water users.

Considerable time has been spent discussing the important of these performance targets. It is not the intention to force associations to adopt these practices. However, it can be safely said that association success will greatly depend upon their doing so. Ultimately, any decision along these lines is up to the association and its leaders.

What can be done to encourage and assist branch canal associations in adopting these practices is to link their adoption to the awarding of O&M contracts. There is some real value and importance to the Ministry in doing so, since it will be awarding cash reimbursements to the association for O&M contract work it has undertaken. The ability of the association to conduct even some modest fiscal record keeping would seem to be necessary.

During the negotiation over the three-year plan, and what O&M contract work the association will express interest in undertaking, the Ministry and Irrigation Department would ask the association if it would be willing to advance on one or more of these targets. Assistance would be provided to the associations in the form of workshops and other support activities to help achieve these targets. These performance targets are integrated into the overall cost-sharing framework. It is probably important to consider some form of penalty for not undertaking any of these performance targets, or at the very least, awarding some additional benefits to those associations who do fulfill these targets.

BCWUA Cost-Sharing Plans

Two branch canal associations were selected for piloting the proposed cost-sharing framework. These are (1) the Qemri Branch Canal Association and (2) the Bahr el Darham Branch Canal Association.

In May, 1999, focus group sessions were held with the councils of each of these associations to determine their interest in participating in branch canal O&M in the near future. The focus group sessions did not utilize the framework presented here. Rather, the councils were simply asked to first identify key O&M problems of local concern to them. This was followed by a discussion of which O&M tasks the association would be willing to assume responsibility for, or to enter into O&M contracts for, in the future. The focus groups ended with a recording of this information, although no timetable was set for implementation. It was primarily a scooping exercise, an important one for the association development program.

The plan for the Qemri association is essentially the same one shown in the worksheets. The plan for Bahr el Darham presented in Chapter 5 of the Main report, and is based on some relatively sketchy knowledge of association council concerns. Additional work will probably need to be done with this particular council. It is in an unimproved area.

It is hoped that the current cost-sharing framework, or a modification of it, might be considered as a next step in proceeding with both pilot areas. Additional workshops and procedures, as presented in the accompanying GANTT chart, would be conducted to arrive at a more complete plan for each association.

It is anticipated that, in the two pilot areas, the O&M costs would be somewhat different. The systems are different sizes. Qemri is approximately 7000 *feddans*, while Bahr el Darham is about 6400 *feddans*. Qemri has 84 mesqas, many of which are improved. The Bahr el Darham canal has five mesqas, with an additional three branches, that in turn have their own mesqas internally. No mesqa improvements have occurred here. Finally, the Qemri branch canal has had some improvements made to it in conjunction with the mesqa improvement program undertaken there. Bahr el Darham has, of course, had no improvements made to it.

Some of these structural differences, and exposure to the mesqa improvement package, appear reflected in the willingness of farmer to assume certain O&M activities. For instance, canal weeding was viewed as important in both systems, and an area that the councils felt they could be involved in.. On the other hand, there were certain items that were more important to Qemri than to Bahr el Darham. These differences will be reflected in their respective overall costs as well. It has been roughly estimated that the cost of operating the Bahr el Darham system might be about 35% to 40% greater than the cost of operating the Qemri system. This is reflected in some of the base value costs in each of the association cost-sharing plans.

The cost-sharing plans for Qemri and Bahr-el-Darham branch canals can be found in Chapter 5 of the main benchmark report.

Appendix C

Summary Proceedings of Second national Conference on Participatory Irrigation Management 15 – 18 November 1998

Appendix D-1

Process Documentation and Records of Branch Canal Water User Associations:

A. Qemri, and

B. Bahr el Darham

APPENDIX D-2

Process Documentation and Records of Branch Canal Water User Associations:

Balaqtar

Appendix D-1

Section 1: Qemri Branch Canal Water User Association

The following documents are included in this compendium.

1. Map of branch canal and its command area under irrigation. Map obtained by the Irrigation Department.

2. Records of initial on-the-job orientation for IAS, IIP and Irrigation Department officers engaged in the formation and organization of the Qemri BCWUA.

3. Local action plan for BCWUA establishment and implementation

4. List of influential persons identified for initial contact on the BCWUA

    - Farmer leaders
    - Educational and religious leaders
    - Local, regional and national politicians

5. Records and minutes of all meetings with influential persons on the Branch Canal.

6. Plan prepared for clustered farmer meetings.

7. Records and minutes of all cluster meetings with farmers, including names, address of all participants, discussion agenda, conclusions and resolutions.

8. Weekly Field reports from IAS staff to IAS General Director. These reports detail the chronology of events leading to the formation of the BCWUA, including individual meetings with farmers and clusters of farmers.

9. BCWUA registration form issued by the Irrigation Department.

10. BCWUA meeting agendas

11. Election of Executive Council members and officers.

12. Signed oath and pledge by BCWUA Executive Council members.

Appendix D-1

Section 2: Bahr el Darham Branch Canal Water User Association

The following documents are included in this compendium.

1. Map of Branch Canal and its command area under irrigation. Map obtained by the Irrigation Department.

2. Records of Initial On-the-Job Orientation for IAS, IIP and Irrigation Department officers engaged in the formation and organization of the Bahr el Darham BCWUA.

3. Basic data and information collected for Bahr el Darham branch canal and command area, including mesqa intakes, discharge, land area under cultivation, cropping patterns, etc.)

4. Local Action Plan for BCWUA Establishment and Implementation

5. List of Influential Persons Identified for Initial Contact on the BCWUA

    - Farmer Leaders
    - Educational and Religious Leaders
    - Local, Regional and National Politicians

6. Records and minutes of all meetings with influential persons on the Branch Canal.

7. Plan Prepared for Clustered Farmer Meetings.

8. Records and minutes of all Cluster Meetings with farmers, including names, address of all participants, discussion agenda, conclusions and resolutions.

9. Weekly Field reports from IAS staff to IAS General Director. These reports detail the chronology of events leading to the formation of the BCWUA, including individual meetings with farmers and clusters of farmers.

10. BCWUA Registration Form issued by the Irrigation Department.

11. BCWUA meeting agendas

12. Election of Executive Council members and officers.

13. Signed Oath and Pledge by BCWUA Executive Council members.

Appendix D-2

Balaqtar Branch Canal Water User Association

The following documents are included in this compendium.

1. Map of Branch Canal and its command area under irrigation. Map obtained by the Irrigation Department.

2. Records of Initial On-the-Job Orientation for IAS, IIP and Irrigation Department officers engaged in the formation and organization of the Balaqtar BCWUA.

3. Local Action Plan for BCWUA Establishment and Implementation

4. List of Influential Persons Identified for Initial Contact on the BCWUA

    - Farmer Leaders
    - Educational and Religious Leaders
    - Local, Regional and National Politicians

5. Records and minutes of all meetings with influential persons on the Branch Canal.

6. Complete list of farmers and landholdings on Balaqtar Branch Canal.

7. Plan Prepared for Clustered Farmer Meetings.

8. Records and minutes of all Cluster Meetings with farmers, including names, address of all participants, discussion agenda, conclusions and resolutions.

9. Weekly Field reports from IAS staff to IAS General Director. These reports detail the chronology of events leading to the formation of the BCWUA, including individual meetings with farmers and clusters of farmers.

10. BCWUA Registration Form issued by the Irrigation Department.

11. BCWUA meeting agendas

12. Election of Executive Council members and officers.

13. Signed Oath and Pledge by BCWUA Executive Council members